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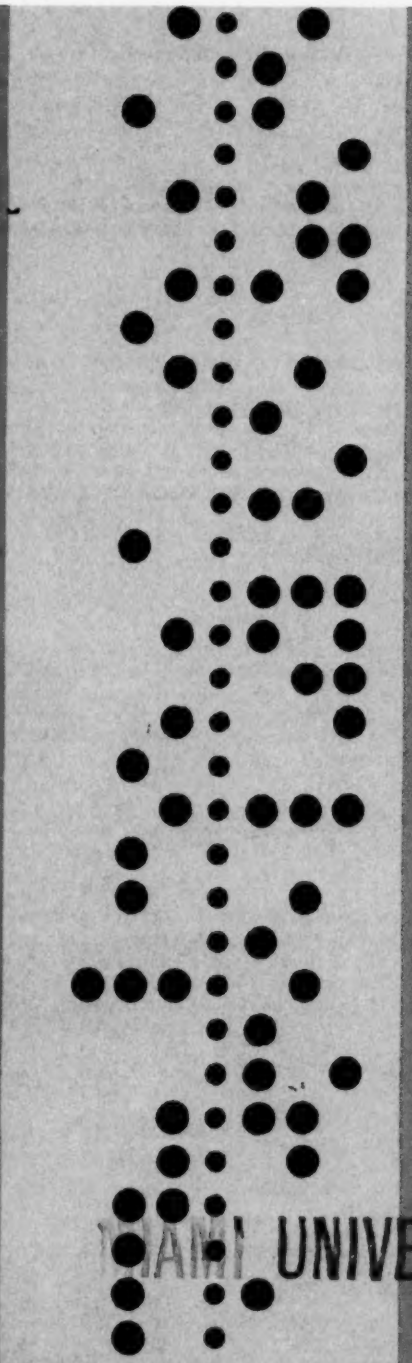
May 25, 1966

U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS



JUN 20 1966

Semi-Monthly Journal

- *Abstracts of R & D Reports*
- *List of Current R & D Projects*
- *Indexes*

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May 25, 1966 / Volume 41, Number 10

U.S. Government

RESEARCH AND DEVELOPMENT REPORTS

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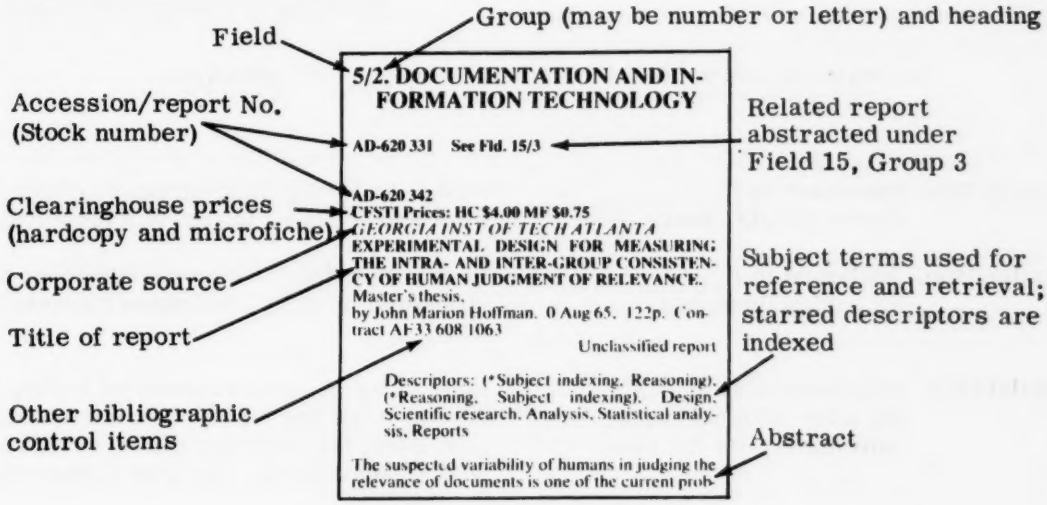
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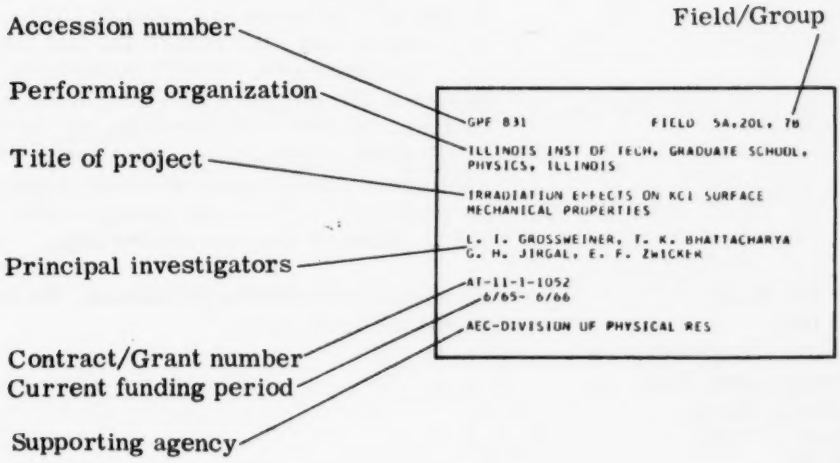

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Indexes--Subject, Personal Author, Corporate Source, Contract Number, Accession/Report Number.

SUBJECT CATEGORY HEADINGS

01 AERONAUTICS 1, S-1

Includes aerodynamics; aeronautics; aircraft; aircraft flight control and instrumentation; and air facilities.

02 AGRICULTURE 2, S-2

Includes agricultural chemistry; agricultural economics; agrieultural engineering; agronomy and horticulture; animal husbandry; and forestry.

03 ASTRONOMY AND ASTROPHYSICS 2, S-2

Includes astronomy; astrophysics; and celestial mechanics.

04 ATMOSPHERIC SCIENCES 4, S-3

Includes atmospheric physics and meteorology.

05 BEHAVIORAL AND SOCIAL SCIENCES 9, S-4

Includes administration and management; documentation and information technology; economics; history, law and political science; human factors engineering; humanities; linguistics; man-machine relations; personnel selection, training, and evaluation; psychology (individual and group behavior); and sociology.

06 BIOLOGICAL AND MEDICAL SCIENCES 16, S-10

Includes biochemistry; bioengineering; biology; bionics; clinical medicine; environmental biology; escape, rescue, and survival; food; hygiene and sanitation; industrial (occupational) medicine; life support; medical and hospital equipment and supplies; microbiology; personnel selection and maintenance (medical); pharmacology; physiology; protective equipment; radiobiology; stress physiology; toxicology; and weapon effects.

07 CHEMISTRY 26, S-13

Includes chemical engineering; inorganic chemistry; organic chemistry; physical chemistry; and radio and radiation chemistry.

08 EARTH SCIENCES AND OCEANOGRAPHY 31, S-15

Includes biological oceanography; cartography; dynamic oceanography; geochemistry; geodesy; geography; geology and mineralogy; hydrology and limnology; mining engineering; physical oceanography; seismology; snow, ice, and permafrost; soil mechanics; and terrestrial magnetism.

09 ELECTRONICS AND ELECTRICAL ENGINEERING 36, S-15

Includes components; computers; electronic and electrical engineering; information theory; subsystems; and telemetry.

10 ENERGY CONVERSION (Non-Propulsive) 42, S-22

Includes conversion techniques; power sources; and energy storage.

11 MATERIALS 42, S-22

Includes adhesives and seals; ceramics, refractories, and glasses; coatings, colorants, and finishes; composite materials; fibers and textiles; metallurgy and metallography; miscellaneous materials; oils, lubricants, and hydraulic fluids; plastics; rubbers; solvents, cleaners, and abrasives; and wood and paper products.

12 MATHEMATICAL SCIENCES 47, S-24

Includes mathematics and statistics and operations research.

13 MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING 54, S-24

Includes air conditioning, heating, lighting, and ventilating; civil engineering; construction equipment, materials, and supplies; containers and packaging; couplings, fittings, fasteners, and joints; ground transportation equipment; hydraulic and pneumatic equipment; industrial processes; machinery and tools; marine engineering; pumps, filters, pipes, tubing, fittings, and valves; safety engineering; and structural engineering.

14 METHODS AND EQUIPMENT 59, S-31

Includes cost effectiveness; laboratories, test facilities, and test equipment; recording devices; reliability; and reprography.

15 MILITARY SCIENCES 61, S-33

Includes antisubmarine warfare; chemical, biological, and radiological warfare; defense; intelligence; logistics; nuclear warfare; and operations, strategy, and tactics.

16 MISSILE TECHNOLOGY 62, S-33

Includes missile launching and ground support; missile trajectories; missile warheads and fuzes; and missiles.

17 NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES 62, S-34

Includes acoustic detection; communications; direction finding; electromagnetic and acoustic countermeasures; infrared and ultraviolet detection; magnetic detection; navigation and guidance; optical detection; radar detection; and seismic detection.

18 NUCLEAR SCIENCE AND TECHNOLOGY 68, S-36

Includes fusion devices (thermonuclear); isotopes; nuclear explosions; nuclear instrumentation; nuclear power plants; radiation shielding and protection; radioactive wastes and fission products; radioactivity; reactor engineering and operation; reactor materials; reactor physics; reactors (power); reactors (non-power); and SNAP technology.

19 ORDNANCE 69, S-38

Includes ammunition, explosives; bombs; combat vehicles; explosions, ballistics, and armor; fire control and bombing systems; guns; rockets; and underwater ordnance.

20 PHYSICS 70, S-40

Includes acoustics; crystallography; electricity and magnetism; fluid mechanics; masers and lasers; optics; particle accelerators; particle physics; plasma physics; quantum theory; solid-mechanics; solid-state physics; thermodynamics and wave propagation.

21 PROPULSION AND FUELS 88, S-45

Includes air-breathing engines; combustion and ignition.

22 SPACE TECHNOLOGY 91, S-46

Includes astronautics; spacecraft; spacecraft trajectories and reentry; and spacecraft launch vehicles and ground support.

RESEARCH highlights

Reports of current high industrial interest

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Ceramics, Refractory Materials (Non-Metallic)

ULTRASONIC MACHINING ADVISED FOR BRITTLE NONMETALLICS

(Order Stock No. AD-629 973 An Evaluation of the Ultrasonic Machining Process, HC $1.00/MF $0.50.)

Ultrasonic machining is particularly suited for brittle nonmetallic materials because the machining rate is highest for these materials, Rock Island Arsenal reports in an evaluation review of the process. Often this relatively new machining process is chosen because the brittle nonmetallic materials cannot be machined by the electric spark, electrochemical, or chemical methods. Also, the shapes that can be produced in these materials with ultrasonic machining are not limited to the relatively simple geometries that can be attained by diamond machining or grinding. Holes or cavities of any shape can be generated by straight line motion (plunge cut) with a tool having the required shape or by a combination of cuts with simpler tools. Repanning, broaching, reaming, slicing, dicing, cavity sinking, or surface grinding can be carried out. The technique works on the principle of hard abrasive particles driven into the workpiece by a tool which vibrates at ultrasonic frequency with a relatively small amplitude. The abrasive also causes tool wear, but this is minimized by selecting a suitable material for the tool. Material is removed in the form of tiny particles that are flushed away by a liquid slurry which also carries away broken down abrasive particles and supplies fresh ones to the cutting area.

Fibers and Textiles

APPAREL INDUSTRY STILL LAGS IN AUTOMATION

(Order Stock No. PB-169 462 State-of-the-Art Investigation on Automated Handling of Limp Fabrics, HC $4.00/MF $1.00.)

Extensive experimental and development work is needed before money-saving automation is achieved in the apparel industry of the United States, according to a state-of-the-art study on automated handling of limp fabrics. The study was sponsored by the Textile and Apparel Technology Center of the National Bureau of Standards and the Apparel Research Foundation. Specifically, much more R and D is necessary for perfecting equipment for orientation of a ply or piece in direction and plane, for mating of two or more pieces at the work point, and for accurate stacking of the work following the fastening operation. At present these are primarily costly manual operations in many textile plants across the country.

The Center's report points out that production in the apparel industry is similar to what it was in 1938 when a U.S. Department of Labor study said, "The outstanding peculiarity of the industry is that the sewing machine, unlike the machines used in other industries (such as the weaving loom, the papermaking machine, or the automatic bottle machine), is not a machine that automatically governs the output, with the operator functioning as a mere machine tender. In contrast, it is the sewing-machine operator who controls the output of the sewing machine which she uses as a tool." The report suggests that a research program to overcome these deficiencies should consist of five phases: (1) separation and pickup, (2) orientation in direction and plane, (3) mating, (4) control of work through work point, and (5) flat stacking. Only the first has been fairly well developed for potential use in automated schemes. The rest are primarily oriented toward manual operations.

Space Technology

AEROBEE COMPENDIUM SUMMARIZES PERFORMANCE DATA

(Order Stock No. N66-14910 A Compendium of Aerobee Sounding Rocket Launchings From 1959 Through 1963, HC $5.00/MF $1.00.)

Aerobee sounding rocket launchings from 1959 through 1963 have been summarized in a Space Agency publication that gives a compilation of actual vehicle performance data. Launched from Wallops Island, Va., the Aerobees carried payloads from 100 to more than 300 pounds to altitudes from 100 to 180 miles while maintaining a stable, near-vertical trajectory. A variety of payloads accomplished airglow, aurora, and solar X-ray detection. They have measured solar ultraviolet radiation and have even collected micrometeoroids. According to NASA, these experiments are but a few of those performed by scientists doing upper atmosphere research. The NASA report does not discuss the success of the scientific data collected through Aerobee sounding rocket experimentation. Rather, the information presented is intended to provide users with statistics on the performance of past sounding rocket firings from which Aerobee vehicle capabilities can be evaluated. The report is illustrated with many line drawings and fine screen photographs.

Mechanical Equipment

SUPERIOR VIBRATION ABSORBER IS BASED ON GYRO RESONANCE

(Order Stock No. N66-12160 Analytical Research on a Synchronous Gyroscopic Vibration Absorber, HC $3.00/MF $0.75.)

A synchronous dynamic vibration absorber based on gyroscopic resonance is not only feasible, says the Kaman Aircraft Corporation, but it is superior to the conventional Frahm absorber. Kaman says it has demonstrated the feasibility of the gyro vibration absorber (GVA) both analytically and experimentally. According to a National Bureau of Standards scientist who evaluated the program report of the Kaman work, "This is an important development in reducing the effects of vibration in all rotating machinery and especially in aircraft. The paper may become a classic in the field."

"Almost all vehicles," says the Kaman report, "from rockets to railroad cars are subjected to some excitation which is a harmonic of the speed of rotating machinery, such as wheels, pumps, actuators, and so forth. Synchronization of the GVA to such discrete harmonics is uncomplicated, involving only an open-loop means of driving the gyroscopic disc at a speed which is a multiple of the speed of the disturbing machinery."

The Gyroscopic Vibration Absorber (GVA) is a completely inertial, conservative means of reacting a sinusoidal force. A natural frequency in the decoupled GVA is achieved through an oscillating flow of energy between the precessional and nutational kinetic states of the gyroscopic disc which is analogous to the more common case of the elastic-inertial system in which the energy flows between the potential energy and kinetic energy states. The antiresonant frequency of the GVA is, for small precessional and nutational angles, linearly proportional to the angular velocity of the gyroscopic disc. If the disc velocity is properly synchronized to the frequency of a sinusoidal excitation, the GVA will produce an antiresonance on the structure at all values of the excitation frequency, thereby producing the effect of theoretically infinite bandwidth as regards the excitation to which the GVA is synchronized.

Control Systems and Instrumentation

NEW GAGE MEASURES SUDDEN PRESSURE INCREASE IN VACUUM CHAMBERS

(Order Stock No. N66-15828 Construction and Evaluation of a Nude Fast-Response Cold-Cathode Ionization Gage, HC $2.00/MF $0.50.)

A cold-cathode ionization gage developed by the Space Agency can measure a sudden pressure increase from 10^{-6} to 10^{-3} torr. An experimental gage was first constructed to allow variation in the electrode material, gage geometry, and the electric and magnetic fields. These parameters were varied to determine a suitable combination which would give linearity, sensitivity, and other operational characteristics. Response-time tests for an optimized gage were then made. These studies indicated a gage response time of less than 100 microseconds for a pressure increase from 10^{-6} to 10^{-3} torr. NASA's report describing the development shows that the location of the gage in the vacuum chamber is important in effectively determining the response time histories. This gage can be employed in vacuum facilities where measurements of rapidly increasing pressures are to be obtained.

Information Technology

INFORMATION STORAGE AND RETRIEVAL REPORT ORIENTS NEWCOMER

(Order Stock No. AD-630 089 Information Storage and Retrieval, A State-of-the-Art Report, HC $6.00/MF $1.50.)

To orient a newcomer into the field of information storage and retrieval, AUERBACH Corporation has prepared a state-of-the-art report that defines the functions of an IS and R system and indicates the general type of equipment used in each particular function. In the Foreword to the report, Walter M. Carlson, Director of Technical Information, Department of Defense, states, "The problems of information storage and retrieval have received extensive discussion in the past decade, but few solutions to the problems have survived the cruel test of real world application. Accordingly, the field continues to engender strong controversies on matters ranging from problem definition and user need to the best techniques for using computers.

"In such a climate, it is rare that one finds a dispassionate, factual, and comprehensive state-of-the-art report. This volume provides what I consider to be one of the more useful ones now available (March 1966), even though it brings the field up to mid-1964."

Transportation (Land, Sea, Air, Space)

AIRPORTS' RUNWAY LIGHTING INADEQUATE FOR DENSE FOG

(Order Stock No. PB-169 554 Evaluation of Runway Lighting Systems for Effectiveness in Dense Fog, HC $6.00/MF $1.25.)

Tests of runway lighting systems in dense fog show that those in general use for centerline lights at U.S. airports do not provide effective guidance in a fog density of 1200-ft visual range, day or night. This conclusion by the University of California's Institute of Transportation and Traffic Engineering was reached from tests performed for the Federal Aviation Agency in a special test facility using artificially produced fog and a linear scale reduction factor of 1/10. The University's engineers made their evaluations from pilot observations, as well as photometric-measurement and photographic techniques. The 200 to 300 cp intensity lighting systems at 25-ft spacing now in general use for centerline lights are not only inadequate for landing in either the daytime or at night, say the engineers, but even 2000 cp at 25-ft spacing is just marginally adequate in the daytime with relatively high background brightness. The report also found that on the basis of pilots' reactions, the present U.S. standard pattern (3:3:3) for touchdown-zone and centerline lights is more effective than either of two other patterns (3:2:1 and 7:3:1) evaluated. In addition, the present approach-light system, says the report, should be modified by adding a white light barrette halfway between the terminating bar and the threshold, and changing the inner 5-light segment of the terminating bar to white light. Pilot observers show a decided preference for this modification, the report concludes.

CLEARINGHOUSE OFFERS PUBLIC ROADS' COLOR TOLERANCE CHARTS

(Order Stock No. PB-169 553 Color Tolerance Charts for Manual on Uniform Traffic Control Devices for Streets and Highways, HC $6.00.)

Color tolerance charts prepared by the U.S. Bureau of Public Roads to promote uniformity in highway signs are available from the Clearinghouse. The Manual prescribes color combinations for various classifications of highway signs, and the color tolerance charts—yellow, red, blue, and green—provide a set of standards that can be used to implement a specification. The charts are constructed to show the desired color and a number of colors representing the maximum color differences permissible.

Bonding/Joining

BIBLIOGRAPHY LISTS CURRENT REPORTS ON WELDING METHODS

(Order Stock No. NASA-SP-5024 Bibliography on Welding Methods, HC $1.00/MF $0.75.)

NASA's Technology Utilization Division has prepared a bibliography on welding methods that assesses and identifies for industry the current literature on applications and uses. The bibliography is intended to indicate the wealth of new information and technology available from the collections of NASA and to select and list available information of special interest to the industrial user. Entries are listed by source publication and are annotated. Such items are included as a power supply for an electron beam welder, welding of 2-inch thick titanium alloy plate, spot welding of sintered aluminum powder with D16AT and AMg6 alloys, automatic arc and molten-slag arcless electric welding of heat-resistant alloys, inert-gas shielded arc welding of heat-resistant alloys, development of ultrasonic welding equipment for refractory metals, welding for electronic assemblies, and electrodes and fluxes for arc welding.

FASTENER TESTS DEVELOP USAGE AND DESIGN DATA

(Order Stock No. N66-14784 Evaluation of Fasteners and Fastener Materials for Space Vehicles, HC $7.00/MF $2.25.)

An evaluation of high strength fasteners and fastener materials has been made by Standard Pressed Steel for the Space Agency. The study surveyed current types, subjected them to standard fastener tests, and selected potential high-strength fastener materials. The evaluation developed usage and design data for 21 different classes of fasteners. Tests conducted on these classes included tensile, shear, stress rupture, stress relaxation, nut reusability, nut vibration, corrosion resistance, effects of thermal cycling, and the effects of relaxation on mechanical properties. The evaluation selected candidate materials and types primarily for space vehicle application, but since the entire array of high-strength fasteners on the market today was surveyed, the evaluation has obvious application and interest to fastener engineers in general. The results indicate that fasteners fabricated from corrosion resistant iron, nickel, and aluminum base alloys show definite suitability for application from -423°F to their maximum use temperatures. Fasteners fabricated from AISI H-11 alloy heat treated to a 220 ksi stress level and titanium alloys of standard Ti-6Al-4V and Ti-7Al-12Zr can be considered for cryogenic applications down to -423°F in shear only if combined bending is not prevalent.

Management Control, Decision Systems

U.S. EXPORTERS CAN NOW BUY CUSTOMS JOURNALS

(Order International Customs Journals listed below by Country and Stock No. The first price listed is for HC; the second is for MF.)

Heretofore the U.S. Department of Commerce has been able to furnish businessmen with copies of the International Customs Journals on a loan basis only, since the International Customs Tariffs Bureau in Brussels restricts distribution of the Journals to member governments. The Department recently made arrangements, however, which enable it to sell reproductions of the Journals to exporters for their permanent reference. The Journals consist of translations of the national customs tariffs of various countries, as well as other official pronouncements bearing on their custom systems.

COUNTRY	STOCK NO.	PRICES	COUNTRY	STOCK NO.	PRICES
Australia	PB-169284	$6/1.25	Liberia	PB-169286	$1/ .50
Austria	PB-169260	6/1.25	Libya	PB-169290	3/ .75
Bulgaria	PB-169253	1/ .50	Malaysia	PB-169264	2/ .75
Kingdom of Burundi	PB-169263	4/1.00	Malta	PB-169292	2/ .50
Canada	PB-169274	5/1.00	Mali	PB-169257	4/ .75
Ceylon	PB-169270	2/ .50	Isle of Man	PB-169288	1/ .50
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Ghana	PB-169282	1/ .50	South Africa	PB-169255	6/1.25
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India	PB-169256	3/ .75	United States	PB-169293	7/1.50
Ireland	PB-169259	6/1.25	U.S.S.R.	PB-169254	1/ .50
Italy	PB-169281	7/1.75	Zambia	PB-169273	3/ .75
Jordan	PB-169277	4/ .75			

Sanitary Engineering

POWER-WATER DESALTING PLANT PLANNED FOR ISRAEL

(Order Stock No. AEC 66-1-RE Engineering Feasibility and Economic Study for Dual-Purpose Electric Power-Water Desalting Plant for Israel, HC $2.00/MF $1.75.)

An engineering and economic study for the design of a nuclear reactor plant in Israel to furnish electric power and desalted water shows that a plant with a capacity of 200 megawatts of salable electricity and a daily output of 100 million gallons of fresh water is feasible. Prepared for the United States-Israel Joint Board by Kaiser Engineers and the Catalytic Construction Company, the study notes that Israel anticipates a serious water problem by the early 1970's and that the dual-purpose plant is technically feasible for initial operation in 1971 and full commercial operation by late 1972. The plant would consist of a light water nuclear reactor supplying steam to a turbine-generator producing electric power. The turbine exhaust steam in turn supplies heat to the brine heaters of the desalting plant wherein this exhaust steam is condensed before returning to the reactor. In the brine heater the turbine exhaust steam furnishes the thermal energy required by the desalting plant for evaporating fresh water from seawater. The concentrated brine resulting from the partial evaporation of seawater is returned to the sea.

OFFICE OF WATER RESOURCES RESEARCH CITES PROGRESS

(Order Stock No. PB-169 625 - 1965 Annual Report — Cooperative Water Resources Research and Training, HC $4.00/MF $1.00.)

The first annual report to Congress summarizing the progress of the Office of Water Resources Research (OWRR) for Fiscal Year 1965 has been published by the U.S. Department of the Interior. The report describes the accomplishments of the 51 water resources research centers that have been set up in each of the States and in Puerto Rico. Supported by Federal grant funds, these research centers are designed to strengthen the Nation's capability in water resources conservation and management to meet the requirements of its expanding population. In addition to summarizing the first year's progress of the OWRR, the publication includes the report and recommendations of a panel of scientists, engineers, and others experienced in public affairs related to water resources. Their report calls for the amendment of Title II of the Water Resources Research Act of 1964 which presently restricts the water research effort and the training of water scientists by the failure to enlist, on a par with the landgrant colleges and universities, the contributions and talents of other well qualified institutions, individuals, and agencies. "The enormous dimensions and complexity of the Nation's oncoming water supply problems, and the urgency of solving them in time," says the panel report, "demand that we use the best-trained scientists and facilities available, wherever they are."

Chemicals

NEW DETECTOR IDENTIFIES ELEMENTS BY RADIOISOTOPE X-RAY

(Order Stock No. NYO-3160-1 Investigation of a New Type Narrow Band X-Ray Detector for the Identification of Chemical Elements Using Radioisotope X-Ray Sources, HC $3.00/MF $0.75.)

A new narrow band x-ray detection system has been developed by Tracerlab for the identification and measurement of chemical elements by means of radioisotope induced x-ray fluorescence. Using the new apparatus, researchers obtained good results for the low, medium, and high atomic number regions. Up to 20 different elements can be handled by the system, and the developers are optimistic that the apparatus can be improved for detection of other elements. Tracerlab's report describing the apparatus discusses an alpha and a beta system, a comparison of narrow band fluorescence and Rayleigh scattering methods, and a study of optimum geometry.

NEW FAMILY OF ORGANOMETALLIC POLYMERS

(Order Stock No. AD-629 554 Synthesis of Group IV Organometallic Polymers and Related Compounds, HC $3.00/MF $0.75.)

A great variety of novel group IV organometallic polymers having molecular weights up to 150,000 have been prepared by the Institute for Organic Chemistry, Utrecht, Netherlands, by means of poly-addition reactions involving organotin dihydrides and difunctionally unsaturated reactants. The polymers range in appearance from rubbery or thermoplastic solids to viscous oils. A low softening temperature (around 100°C) seems to be an inherent property of the solid linear polymers as a result of the presence of the bulky organotin group in the polymer main chain. The polymers have a carbon chain regularly interrupted by the Group IV elements, including silicon, germanium, tin, or lead. They were synthesized by poly-addition reactions involving an organotin dihydride and either a dienic, a diynic, or a monoynic compound.

CURRENT research & development PROJECTS

01. Aeronautics

GQF 420543 FIELD 12A,13M,20H,20A

GEN APPLIED SCIENCE, E LAB, WESTBURY, NEW YORK

STUDY OF SPHERICAL IMPLUDING WAVES FOR HIGH STAGNATION TEMPERATURES AND PRESSURES

H. RUBIN, E. LIEBERMAN

AF-40-600-1119
/65- /

DOD-AIR FORCE

GQF 420545 FIELD 20D,10B

AERODYNAMIC PROBLEMS IN LOW DENSITY HIGH MACH NUMBER REGIMES

L. POTTER, M. KINSLOW

AF-40-600-1000
/65- /

DOD-AIR FORCE

GQF 420565 4 FIELD 20D,10B

IMPROVED METHODS FOR DETERMINING SECOND-THROAT DIFFUSER PERFORMANCE OF ZERO-SECONDARY FLOW EJECTORSYSTEMS

R. C. GERMAN, R. C. BAUER

AF-40-600-1000
/65- /

DOD-AIR FORCE

ZQF 284899 FIELD 9+, 9A,12A, 9C

USAF, AF ACADEMY, ACADEMY, COLORADO

APPLICATION OF REAL GAS THEORY TO SHOCK TUBE STUDIES

D. S. JOHNSON
/65- /

DOD-AIR FORCE

03. Astronomy and Astrophysics

GQF 3733 1 FIELD 3A

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, ASTRONOMY, OHIO

THE SPECTRUM OF THE G9 GIANT STAR EPSILON VIRGINIS
W. K. BONSACK

AF-AFOSR-0505-64
/65- /

DOD-AIR FORCE

GQF 4513 FIELD 3A, 5A

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, ATMOS PHYS + ASTROPHYS, COLORADO

SYMPOSIUM ON STELLAR ATMOSPHERES
R. N. THOMAS
AF-AFOSR-0893-65
/65- /

DOD-AIR FORCE

GQF 6717 1 FIELD 3A,12A

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, ASTRONOMY, NEW YORK

THE STRUCTURE + EVOLUTION OF STARS BETWEEN GO AND FO ALONG THE MAIN SEQUENCE

L. MOTZ
AF-49-638-01335
/65- /

DOD-AIR FORCE

GQF 258678 FIELD 3A, 3B

UNIVERSITY OF ARIZONA, GRADUATE SCHOOL, ASTRONOMY, ARIZONA

PERFORM LUNAR INVESTIGATIONS BY OBTAINING NEW HIGH QUALITY LUNAR PHOTOGRAPHS FOR STUDY + ANALYSIS

G. P. KUIPER
AF-19-628-04332
/65- /

DOD-AIR FORCE

GQF 258752 2 FIELD 3A, 3B

STUDY OF CORRELATION BETWEEN INTER STELLAR POLARIZATION + REDDENING OF STARLIGHT

W. LILLER

AF-19-628-02790
/65- /

DOD-AIR FORCE

GQF 258774 FIELD 3A, 3B

UNIV OF MANCHESTER, UNITED KINGDOM

THEORETICAL + EXPERIMENTAL STUDY OF THE PARAMETERS OF THE LUNAR BODY

Z. KOPAL

AF-EOAR-0049-64
/65- /

DOD-AIR FORCE

GQF 260431 FIELD 3A, 3B

TRAVELERS RES CTR, CONNECTICUT

PROVIDE ASSISTANCE IN PROCESSING DATA DESCRIBING SOLAR ACTIVE REGIONS THROUGH UNIQUE SCREENING ROUTINE

. NONE

AF-19-628-05129
/65- /

DOD-AIR FORCE

GQF 260442 FIELD 3A, 3B

UNIVERSITY OF HAWAII, GRADUATE SCHOOL, HAWAII

STUDIES OF THE STRUCTURE AND SPECTRA OF THE SOLAR ATMOSPHERE

J. S. JEFFERIES

AF-19-628-05086
/65- /

DOD-AIR FORCE

GSP 2116 FIELD 3A

UNIV OF MINNESOTA, GRADUATE SCHOOL, ASTRONOMY, MINNESOTA

MOTIONS OF VERY FAINT STARS

W. J. LUYTEN

NSF-GP-4309
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2142 FIELD 3A

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, METEOROL + OCEANOGRAPH, MICHIGAN

GENERAL CIRCULATION OF THE MARTIAN ATMOSPHERE

E. S. EPSTEIN

NSF-GP-4385
9/65- 9/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2148 FIELD 3A, 5A

SOLAR ACTIVITY AND THE UPPER LEVEL TROUGH

D. D. WOODBRIDGE

NSF-GP-4767
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2215 FIELD 3A, 3B

UNIV OF WISCONSIN, GRADUATE SCHOOL, ASTRONOMY, WISCONSIN

SPECTROPHOTOMETRY OF K AND M GIANTS

L. R. DOHERTY

NSF-GP-4663
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2216 FIELD 3A, 5A

UNIVERSITY NEW MEXICO, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, NEW MEXICO

ANOMALOUS BLUEING EFFECT IN THE B - V C OLORS OF DISTANT A STARS

A. G. PHILIP

NSF-GP-4565
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2217 FIELD 3A, 5A

UNIV OF ROCHESTER, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, NEW YORK

MULTIPLE STARS OF THE TRAPEZIUM TYPE AND INFRARED SPECTRAL CLASSIFICATION OF RED STARS

S. SHARPLESS

NSF-GP-4629
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

316-264 O - 66 - B

GSP 2220 FIELD 3A

CLASSIFICATION AND PATTERN OF SPICULES IN THE SOLAR CHROMOSPHERE

B. C. PARMENTER

NSF-GP-4758
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2221 FIELD 3A, 5A

UNIVERSITY OF IOWA, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, IOWA

THEORETICAL INVESTIGATION OF STELLAR ATMOSPHERE

S. MATSUSHIMA

NSF-GP-4742
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2222 FIELD 3A, 3B

INDIANA UNIVERSITY, GRADUATE SCHOOL, ASTRONOMY, INDIANA

PHOTOMETRY OF OLD GALACTIC CLUSTERS

M. S. BURKHEAD

NSF-GP-4666
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2223 FIELD 3A

GEORGETOWN UNIVERSITY, GRADUATE SCHOOL, ASTRONOMY, DIST OF COLUMBIA

ANALYSIS OF THE SOLAR SPECTRUM

C. C. KIESS, H. W. BANKS

NSF-GP-4682
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2224 FIELD 3A, 3B, 5A

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

ATMOSPHERIC PARAMETERS OF CEPHEID VARIABLES

R. A. BELL

NSF-GP-4637
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2225 FIELD 3A, 3B, 5A

MEASUREMENT OF PLANETARY EMISSIONS AT RADIO FREQUENCIES

A. G. SMITH

NSF-GP-4560
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2226 FIELD 3A

VARIABLE STARS IN THE LARGE MAGELLANIC CLOUD

C. P. GAPOSCHKIN

NSF-GP-4638
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2227 FIELD 3A, 3B

UNIV OF PENNSYLVANIA, GRADUATE SCHOOL, ASTRONOMY, PENNSYLVANIA

MULTICOLOR OBSERVATIONS OF SELECTED ECLIPSING VARIABLES

W. BLITZSTEIN, F. B. WOOD

NSF-GP-4558
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2228 FIELD 3A, 5A

CAL INST OF TECHNOLOGY, GRADUATE SCHOOL, PALOMAR OBSERVATORY, CALIFORNIA

SUPERNOVA SEARCH
F. ZWICKY, F. *. ZWICKY

NSF-GP-4631
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2229 FIELD 3A, 3B

WESLEYAN UNIVERSITY, GRADUATE SCHOOL, ASTRONOMY, CONNECTICUT

MAP OF CYGNUS X
E. S. FLETCHER

NSF-GP-4615
5/65-11/65

NSF-PHYSICAL SCIENCES DIVISION

GSP 2230 FIELD 3B

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, ASTRONOMY, MICHIGAN

EXTRACTION OF INFORMATION FROM NOISY SIGNALS
F. T. HADDOCK

NSF-GP-4655
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2231 FIELD 3A, 3B, 5A

UNIVERSITY OF ALASKA, GRADUATE SCHOOL, GEOPHYSICAL INST, ALASKA

SOLAR RADIO EMISSIONS AT VHF
E. J. GAUSS, E. *. GAUSS

NSF-GP-4633
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2232 FIELD 3B

OHIO STATE UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, OHIO

RESEARCH IN RADIO ASTRONOMY
J. D. KRAUS, H. C. KO, R. T. NASH

NSF-GP-3735-A1
10/64-10/65

NSF-PHYSICAL SCIENCES DIVISION

GSP 2233 FIELD 3A, 5A

RENSSELAER POLYTC INST, GRADUATE SCHOOL, PHYSICS, NEW YORK

COLLOQUIUM ON INTERSTELLAR GRAINS
J. M. GREENBERG

NSF-GP-4561
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

ZQF 260123 FIELD 3A, 3B, 4A,12A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

INFRARED TRANSMISSION OF ATMOSPHERIC GASES
/65- /
S. A. CLOUGH
DOD-AIR FORCE

ZQF 260141 FIELD 3A, 3B,20J,20F

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

GROUND-BASED OBSERVATIONS OF SPECTRA OF PLANETARY ATMOSPHERES AND SURFACES

J. W. SALISBURY
/65- /

DOD-AIR FORCE

ZQF 260187 FIELD 3A, 3B,20J,20I

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

OBSERVATIONAL AND LABORATORY ASTROPHYSICS

G. W. WARES
/65- /

DOD-AIR FORCE

ZQF 260194 FIELD 3A, 3B, 4A,20J

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

BALLOON-BORNE SELENODESY

M. S. HUNT
/65- /

DOD-AIR FORCE

04. Atmospheric Sciences

GH 623 1 FIELD 1B

CORNELL AERONAUT. LA, NEW YORK

BASIC RESEARCH IN TECHNIQUES FOR WARM FOG DISPERSAL DESIGNED TO IMPROVE AIRPORT UTILIZATION
J. W. FORD

NASA-NASR-156-E-7
2/64- 3/65

NASA

GPE 844 5 FIELD 4A, 4B

MASS INST OF TECHNOL, GRADUATE SCHOOL, METEOROLOGY, MASSACHUSETTS

PLANETARY TRANSPORT PROCESSES IN THE STRATOSPHERE

V. P. STARR, A. BARNES, J. CLARK
R. DICKINSON, E. N. LORENZ, T. MURAKAMI
R. E. NEWELL

AT-30-1-2241
9/63- 8/64

AEC-BIOLOGY + MEDICINE

GPF 501 3 FIELD 4A, 5A,18A,20H

CORNELL UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

DETECTION OF SUPER SHOWERS BY ATMOSPHERIC

K. GREISEN, K. *. GREISEN, G. TANAHASHI

AT-30-1-3038
9/65- 8/66

AEC-DIVISION OF PHYSICAL RES

GQF 3783 1 FIELD 12A, 8E

JOHNS HOPKINS UNIV, GRADUATE SCHOOL, STATISTICS, MARYLAND

TIME SERIES AND STATISTICAL METEOROLOGY

R. H. JONES

AF-49-638-01302
/65- /

DOD-AIR FORCE

GQF 258344 4 FIELD 12A, 8E

UNIVERSITY OF BERGEN, NORWAY

STUDY OF MATHEMATICAL MODELS OF TIME AND SPACE DISTRIBUTION OF DEW POINT DENSITY AND TEMPERATURE

C. L. GODSKE

AF-61-052-00760
/65- /

DOD-AIR FORCE

GQF 258353 2 FIELD 12A, 5C, 8E

MASS INST OF TECHNOL, GRADUATE SCHOOL, METEOROLOGY, MASSACHUSETTS

STATISTICAL AND DYNAMICAL STUDIES OF ATMOSPHERIC CIRCULATION PROCESSES

E. N. LORENZ

AF-19-628-02409
/65- /

DOD-AIR FORCE

GQF 259080

STUDY OF LOW FREQUENCY ATMOSPHERIC ELECTRIC PHENOMENA ASSOCIATED WITH CLEAR AIR TURBULENCE

. NONE

AF-19-628-05060
/65- /

DOD-AIR FORCE

GQF 259237 FIELD 3A, 4A

THEORETICAL STUDIES OF OUTER SPACE RADIATION TRAPPED BY THE EARTHS MAGNETIC FIELD

J. WINCHESTER

/65- /

DOD-AIR FORCE

GQF 259425 FIELD 12A, 8E

UNIV OF CAL-L. A., GRADUATE SCHOOL, METEOROLOGY, CALIFORNIA

METEOROLOGICAL ANALYSES INCLUDING CLOUD PRESSURE AND HUMIDITY CROSSECTIONS OF EXTRA-TROP CYCLONES

T. N. KRISHNAMURTI

AF-19-628-04777
/65- /

DOD-AIR FORCE

GQF 259426 FIELD 8H,12A, 8E

HEBREW UNIVERSITY, ISRAEL

STUDY OF PHYSICAL-NUMERICAL MODELS OF THE LARGE SCALE ATMOSPHERIC CIRCULATION

A. HUSS

AF-EOAR-0089-65
/65- /

DOD-AIR FORCE

GQF 259429 FIELD 4A, 8+, 9+, 9A

PORCUPINE PULSE DOPPLER RADAR IMPROVEMENTS IN ACCURACY RESOLUTION AND RANGE

S. FORMAN

AF-19-628-04774
/65- /

DOD-AIR FORCE

GQF 259804 1 FIELD 4A,12A, 8E,20H

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

THEORETICAL STUDY OF ASYMPTOTIC EQUATIONS + RAY TRACING FOR SOLUTION OF PROPAGATION IN IONIC MEDIA

M. KLINE

AF-19-628-04065
/65- /

DOD-AIR FORCE

GQF 259837 FIELD 4A

GEOSC., INC., ALAMOG, NEW MEXICO

EXPERIMENTAL RESEARCH FROM VARIOUS GEOGRAPHICAL LOCATIONS ON THE AIRGLOW + AURORAL EMISSION INTENSITY

M. W. JONES

AF-19-628-05062
/65- /

DOD-AIR FORCE

GQF 259870 FIELD 4A

USDC, NATL BUR STAN, BOULDER, COLORADO

RESEARCH STUDIES OF IONOSPHERIC EFFECTS CAUSED BY UPPER AIR CHEMICAL RELEASES

J. W. WRIGHT

/65- /

DOD-AIR FORCE

GSP 2119 FIELD 4A

ATMOSPHERIC PHYSICS

R. M. GOODY

NSF-GP-4293
8/65- 8/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2121

LITTLE ARTHUR D INC, MASSACHUSETTS

THE ORIGIN AND ROLE OF ELECTRICITY IN CLOUDS

C. B. MOORE, B. VONNEGUT

NSF-C358A1
3/64- 3/65

NSF-PHYSICAL SCIENCES DIVISION

GSP 2140 FIELD 8+, 9+

UNIV OF WISCONSIN, SCHOOL OF ENGINEERING, METEOROLOGY, WISCONSIN

THE LOWER ATMOSPHERE USING SCATTERING OF MICROWAVES

W. P. BIRKEMEIER, W. +. BIRKEMEIER

NSF-GP-4352
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2143 FIELD 4A,20I

GRAD RES CTR OF S-WEST, TEXAS

PRIMARY HYDROMAGNETIC SPECTRUM

J. A. FEJER, J. +. FEJER

NSF-GP-4339
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2144 FIELD 4A

IQSY IONOSPHERIC SOUNDING ROCKET PROGRAM-PHOTOGRAPHIC RECORDING AND ANALYSIS

H. D. EDWARDS

NSF-GP-3876
1/65- 1/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2147

RAND CORPORATION, SANTA MONICA, 60; OBS, CALIFORNIA

A WEATHER CONTROL PROGRAM

S. M. GREENFIELD, R. R. RAPP

NSF-GP-C415
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2149 FIELD 7B

UNIV OF NORTH CAROLINA, SCHOOL OF PUBLIC HLTH, ENVIRON SCI + ENGIN, NORTH CAROLINA

OZONE CONCENTRATIONS IN THE LOWER TROPOSPHERE

L. A. RIPPERTON

NSF-GP-4752
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2151 FIELD 3A, 4A, 5A

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, PHYSICS, ILLINOIS

IQSY COSMIC RAY DATA ANALYSIS

P. MEYER

NSF-GP-4709
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2152 FIELD 7D,20M

UNIV OF WISCONSIN, GRADUATE SCHOOL, METEOROLOGY, WISCONSIN

STUDY OF THE EFFECT OF THE HEAT OF SOLUTION ON FREEZING AND CONDENSATION NUCLEI

V. E. SUOMI

NSF-GP-4741
6/65-11/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2153

UNIV OF WASHINGTON, GRADUATE SCHOOL, ATMOSPHERIC SCIENCE, WASHINGTON

ENERGY TRANSFER NEAR THE EARTHS SURFACE

F. I. BADGLEY, R. G. FLEAGLE

NSF-GP-4689
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2155

PENNSYLVANIA ST UNIV, SCHOOL OF MINERAL IND, METEOROLOGY, PENNSYLVANIA

AN INVESTIGATION OF THE DYNAMICS AND MICROPHYSICS OF CLOUDS

C. L. MOSLER

NSF-GP-4743
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2156 FIELD 7B

UNIVERSITY OF MIAMI, GRADUATE SCHOOL, MARINE SCIENCE, FLORIDA

TRITIUM IN HURRICANES

H. G. OSTLUND

NSF-GP-4534
5/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2157 FIELD 4A

PENNSYLVANIA ST UNIV, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, PENNSYLVANIA

ANALYSIS OF IQSY D-REGION MEASUREMENTS

A. J. FERRARO, H. LEE

NSF-GP-4622
1/66- 1/67

NSF-PHYSICAL SCIENCES DIVISION

GSP 2158 FIELD 4A

GRAD RES CTR OF S-WEST, TEXAS

ANALYSIS OF IQSY SUPER NEUTRON MONITOR DATA

K. G. MCCRACKEN, K. *. MCCRACKEN

NSF-GP-4688
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2164 FIELD 4A, 5A, 7B

USOC, NATL BUR STAN, DIST OF COLUMBIA

SODIUM OXIDE PHOTODISSOCIATION DURING THE IQSY ECLIPSE

H. GADSDEN

NSF-GP-4481
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

ZPE 1001 FIELD 8H

ATMOSPHERIC TURBULENCE FIELD STUDIES

P. FRENZEN
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1032 FIELD 4A,18A

US, AEC, OPER OFFICE, NEW YORK

EVALUATION AND DEVELOPMENT OF HIGH ALTITUDE SAMPLING SYSTEMS

A. J. BRESLIN, H. FRANKLIN, P. LOYSEN
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1442

PRECIPITATION SCAVENGING PROCESSES

J. J. FUQUAY, R. J. ENGELMANN
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1445 FIELD 5A,18A

ATMOSPHERIC DIFFUSION, DEPOSITION AND TRANSPORT OF GASES AND PARTICULATES

J. J. FUQUAY, C. E. ELDERKIN, W. T. HINDS P. W. NICKOLA, C. L. SIMPSON
/66- /

AEC-BIOLOGY + MEDICINE

ZQF 260152 FIELD 4A,20J

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ION-MOLECULE REACTIONS

J. F. PAULSON
/65- /

DOD-AIR FORCE

ZQF 260182 FIELD 4A, 8E,12A

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

MODELING TECHNIQUES

L. BERKOSFSKY
/65- /

DOD-AIR FORCE

ZQF 260184 FIELD 12A, 5C, 8E

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

STATISTICAL TECHNIQUES

R. SHAPIRO
/65- /

DOD-AIR FORCE

05. Behavioral and Social Sciences

GQF 212 1 FIELD 20D, 5A

POLYTECH INST BROOKLYN, GRADUATE SCHOOL, NEW YORK

EVALUATION OF ENGINEERING SCIENCES RESEARCH PROGRAM

H. P. WILE
AF-49-638-01294
/65- /

DOD-AIR FORCE

GQF 3787 1 FIELD 12A

INST. FOR SC. INFO.,, PENNSYLVANIA

CITATION INDEX STUDIES FOR INFORMATION CONTROL

I. SHER
AF-49-638-01547
/65- /

DOD-AIR FORCE

GQF 4479 FIELD 12A

WORKING WITH SEMI-AUTOMATIC DOCUMENTATION SYSTEMS

R. P. BARRETT
AF-19-628-03418
/65- /

DOD-AIR FORCE

GQF 6864 1 FIELD 12A, 9D

STUDIES IN MATHEMATICAL AND COMPUTATIONAL LINGUISTIC RESEARCH

H. P. EDMUNDSON
AF-AFOSR-0612-65
/65- /

DOD-AIR FORCE

GQF 6943 1 FIELD 12A, 9D

HEBREW UNIVERSITY, ISRAEL

1964 INTERNATIONAL CONGRESS FOR LOGIC METHODOLOGY AND PHILOSOPHY OF SCIENCE
/65- /
Y. BARHILLEL
DOD-AIR FORCE

06. Biological and Medical Sciences

GPE 659 4 FIELD 7C, 7D, 7A,20M

UNIVERSITY OF ARIZONA, GRADUATE SCHOOL, CHEMISTRY, ARIZONA

FREE RADICALS IN BIOLOGICAL ENERGY CONVERSION EPR STUDIES OF MODEL SYSTEMS

L. S. FORESTER, G. TOLLIN

AT(11-1)908
6/65- 5/66

AEC-BIOLOGY + MEDICINE

GPC 666 3 FIELD 7C, 7D, 7A,20J

LOUISIANA ST UNIV A+M, GRADUATE SCHOOL, CHEMISTRY, LOUISIANA

SPECTROSCOPIC, ELECTRONIC AND ELECTRICAL PROPERTIES OF BIOLOGICALLY-IMPORTANT MOLECULES

S. P. MCGLYNN, D. G. CARROLL, E. F. MCCOY T. N. MISRA

AT(40-1)3018
6/65- 6/66

AEC-BIOLOGY + MEDICINE

GSP 2362 FIELD 12A

UNIV OF KENTUCKY, GRADUATE SCHOOL, MATHEMATICS + ASTRON, KENTUCKY

ARTIFICIAL INTELLIGENCE

N. V. FINDLER

NSF-GP-4664
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

ZPE 870 FIELD 7C, 7D,20J

US, AEC, LOS ALAMOS, NEW MEXICO

OLIGONUCLEOTIDE CHROMATOGRAPHY

A. MURRAY
/66- /

AEC-BIOLOGY + MEDICINE

07. Chemistry

IGM 10274 4 FIELD 7C,20J,20L, 7B

PENNSYLVANIA ST UNIV, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

SPIN SPIN COUPLING IN NUCLEAR MAGNETIC RESONANCE

R. BERNHEIM, H. BATIZ, B. LAVERY
E. REICHENBECKER, B. SCOTT

9/65- 8/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

IGM 10543 4 FIELD 7C, 7D

UNIV OF CAL-DAVIS, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

TOTAL SYNTHESIS OF SANDALWOOD TERPENES

W. E. THIESSEN

8/65- 7/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

IGM 11748 3 FIELD 7C, 7D, 7A, 7B

CORNELL UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

METAL IONS IN TETRAPYRROLES

R. A. PLANE, B. F. BURNHAM, R. SNELLGROVE
P. STEIN

1/66-12/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

1GM 12672 2 FIELD 7C, 7D

GEORGIA INST OF TECH, GRADUATE SCHOOL, CHEMISTRY, GEORGIA

PHOTOCHEMICAL PRODUCTION OF KETENES

E. M. BURGESS, L. N. MCCULLAGH

1/66-12/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

1GM 13987 1 FIELD 7C, 7D

MARSHALL UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, WEST VIRGINIA

BENZENE CYCLIZATION OF TERTIARY AMINES

A. R. LEPLEY

9/65- 5/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

1GM 14036 1 FIELD 7A, 7D,20J

CASE INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, OHIO

ELECTROCHEMISTRY OF LUMINESCENCE AND EXCITED STATES - PREVIOUS ELECTROCHEMICAL STUDY OF

T. KUWANA

1/66-12/66

PHS-NIH-DIV GENERAL MEDICAL SCIENCES

7GX 540 11 FIELD 7D, 7B

KENYON COLLEGE, UNDERGRADUATE SCHOOL, CHEMISTRY, OHIO

DETERMINATION OF IONS IN WASTES AND WATERS

J. M. PAPPENHAGEN, G. L. JOHNSON

7-WP-00137-11
9/65- 8/66

PHS-BSS

7GX 636 6 2 FIELD 13A, 7C, 7D, 7A

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

MECHANISMS OF PHOTOCHEMICAL REACTIONS IN URBAN AIR

J. N. PITTS, E. HEINE, H. W. JOHNSON
W. MORGANROTH, J. VERNON, J. WAN

7-AP-00109-06
7/65-11/65

PHS-BSS

7GX 820 2 FIELD 13B, 7C, 7D

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, MINERAL TECHNOLOGY, CALIFORNIA

THE ADSORPTION OF ALKYLARYL SURFACTANTS ON POLAR SOLIDS

D. W. FUERSTENAU, T. W. HEALY

7-WP-00692-02
9/65- 8/66

PHS-BSS

7GX 1592 2 FIELD 13B, 7C, 7A, 7D

ILLINOIS INST OF TECH, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

PERMANGANATE OXIDATION OF PHENOLS AND AROMATIC AMINES

A. E. MARTELL, M. M. KHAN, C. A. TYSON
7-WP-00744-02
9/65- 8/66

PHS-BSS

GAK 1011 1 FIELD 7C, 9+,20J,20C

MICROWAVE SPECTROSCOPY IN THE MILLIMETER REGION

D. M. LARKIN

AF-EOAR-0019-63
10/63- 9/64

AIR FORCE-OFFICE AEROSPACE RESEARCH

GPF 359 3 FIELD 7C, 7D, 7A,20M

STATE UNIV N Y BUFFALO, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

STUDIES IN SOLUTION AND NUCLEAR CHEMISTRY

J. A. MARINSKY
AT(30-1)2269
10/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 424 3 FIELD 7C, 7D, 7A,20J

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

STUDY OF METAL CHELATES

D. T. SAWYER, Y. O. AOCHI, G. HARGROVE
L. HAYNES
AT-11-1-34-45
10/65- 9/66

AEC-DIVISION OF PHYSICAL RES

GPF 536 3 FIELD 7C, 7D, 7A,20J

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, OHIO

KINETICS OF IONIZING-RADIATION INDUCED REACTIONS IN ORGANIC COMPOUNDS

R. F. FIRESTONE, W. P. BISHOP
D. E. DARLING, M. M. MIKHAIL

AT(11-1)1116
12/65-11/66

AEC-DIVISION OF PHYSICAL RES

GPF 706 3 FIELD 7C, 7D,20H,20L

UNIVERSITY OF FLORIDA, GRADUATE SCHOOL, CHEMISTRY, FLORIDA

PHYSICAL CHARACTERISTICS AND CATALYTIC ACTIVITY OF THORIUM OXIDE

W. S. BREY, R. B. GAMMAGE
AT(40-1)2664
12/65-11/66

AEC-DIVISION OF PHYSICAL RES

GPF 710 4 FIELD 7D, 7A,20M,12A

OHIO UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, OHIO

SPECTROPHOTOMETRIC INVESTIGATION OF CHROMATE COMPLEXES OF THORIUM - IV - , HAFNIUM - IV - , ZIRCONIUM - IV - AND TITANIUM - IV -

J. Y. TONG, R. L. JOHNSON, B. R. KOKENGE

AT-11-1-687
10/65-10/66

AEC-DIVISION OF PHYSICAL RES

GPF 796 1 FIELD 7C, 7A, 7D,20M

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, TEXAS

INITIATION OF BUBBLES IN SUPERSATURATED SOLUTIONS BY IONIZING RADIATION

D. M. HIMMELBLAU
AT(40-1)3326
2/66- 1/67

AEC-DIVISION OF PHYSICAL RES

GQF 3736 1 FIELD 7C, 7A, 7D, 7B

MASS INST OF TECHNOL, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

ORGANOMETALLIC SYNTHESIS OF REACTIVE INTERMEDIATES

D. SEYFERTH
AF-AFOSR-0502-64
/65- /

DOD-AIR FORCE

GQF 3815 FIELD 7C, 7D, 7A,20J

UNIVERSITY OF ARIZONA, GRADUATE SCHOOL, CHEMISTRY, ARIZONA

CHEMISTRY OF ORGANOLITHIUM COMPOUNDS AND ACETYLENES
J. E. MULVANEY

AF-AFOSR-0720-65
/65- /

DOD-AIR FORCE

GQF 4486 FIELD 7C,21B,21I, 7D

CITY UNIV N Y NEW YORK, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, NEW YORK

COMPLEX MIXING PROBLEMS FOR CHEMICAL REACTION SYSTEMS

R. SHINNAR
AF-AFOSR-0921-65
/65- /

DOD-AIR FORCE

GQF 4359 FIELD 7C, 7D, 7A,20J

UNIV OF WISCONSIN, GRADUATE SCHOOL, CHEMISTRY, WISCONSIN

STEREOCHEMICAL ASPECTS OF IONIZATION PROCESSES

H. L. GOERING

AF-AFOSR-0847-65
/65- /

DOD-AIR FORCE

GQF 207484 FIELD 7C, 7D, 7B

NEW YORK UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

CHEMISTRY OF ORGANIC AND INORGANIC COMPOUNDS OF METALS

R. MOSHIER
/65- /

DOD-AIR FORCE

GQF 258633 2 FIELD 7D, 7A,20J, 7B

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, MARYLAND

DETAILED EXPERIMENTAL AND THEORETICAL STUDIES OF LINE WIDTHS OF ROTATIONAL LINES OF GASES

W. M. BENESCH

AF-19-628-02819
/65- /

DOD-AIR FORCE

GQF 259553 FIELD 7D, 7A,20J, 7B

UNIV OF SOUTHAMPTON, UNITED KINGDOM

STUDY OF CHEMICAL KINETIC SYSTEMS EG OZONE VIA INFRARED ABSORPTION SPECTROSCOPY

N. JONATHAN
AF-61-052-00886
/65- /

DOD-AIR FORCE

GQF 259561 FIELD 12A,20H,20J,20L

HEBREW UNIVERSITY, ISRAEL

ANAL OF OPTICAL SPECTRA OF TRANSITION ELEMENTS WITH EMPHASIS ON XRAY FLUORESCENCE + ZEEMAN SPECTRA

W. LOW
AF-61-052-00840
/65- /

DOD-AIR FORCE

GQF 284706 2 FIELD 7D

USDC, NATL BUR STAN, DIST OF COLUMBIA

ELECTROCHEMICAL PHENOMENA AT AN ELECTRODE BY MEANS OF THE NEGATIVEPRESSURE OF LIQUIDS

A. BRENNER
DO-33-657-38763
/65- /

DOD-AIR FORCE

GSE 269 3 FIELD 7D,14E,20M

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CHEMISTRY + CHEM ENGIN, ILLINOIS

PHASE TRANSITION STUDIES BY CINEPHOTOMICROSCOPY

J. W. WESTWATER

NSF-GK-598
10/65- 9/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 776 FIELD 7D,12A

PRINCETON UNIVERSITY, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, NEW JERSEY

CLOSED-LOOP DIGITAL CONTROL OF CHEMICAL PROCESSES
L. LAPIDUS

NSF-GK-460
5/65- 5/66

NSF-ENGINEERING SCIENCES DIVISION

GSP 2190 FIELD 7C, 7D

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

ORIENTED ION PAIRS IN SN1 REACTIONS
W. D. CLOSSON

NSF-GP-4387
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2193 FIELD 7D,20J, 7B

BROWN UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, RHODE ISLAND

ELECTRONIC STRUCTURE OF SOME TRANSITION METAL COMPLEXES

R. L. CARLIN
NSF-GP-4466
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2201 FIELD 7C, 7D, 7B

UNIV OF KENTUCKY, GRADUATE SCHOOL, CHEMISTRY, KENTUCKY

BISAMINE COMPLEXES OF BORONIUM IONS

J. E. DOUGLASS

NSF-GP-4390
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2205 FIELD 7A, 7D,20J

OHIO STATE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, OHIO

EFFECT OF STRUCTURE ON RATES AND EQUILIBRIA

J. HINE

NSF-GP-4445
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2235 FIELD 7A, 7D

UNIVERSITY OF CHICAGO, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

MECHANISMS OF OXIDATION-REDUCTION REACTIONS

J. HALPERN

NSF-GP-654-A1
11/62-11/63

NSF-PHYSICAL SCIENCES DIVISION

GSP 2237 FIELD 7D

UNIVERSITY OF KANSAS, GRADUATE SCHOOL, CHEMISTRY, KANSAS

CRITICAL OPALESCENCE

B. CHU

NSF-GP-3922-A1
1/65- 1/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2238 FIELD 7C, 7D

ENDOR STUDIES OF ORGANIC MOLECULES

A. L. KWIRAM

NSF-GP-4612
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2243 FIELD 7D

UNIVERSITY OF ARIZONA, GRADUATE SCHOOL, CHEMISTRY, ARIZONA

DETERMINATION OF PHYSIOCHEMICAL PARAMETERS BY GAS LIQUID CHROMATOGRAPHY

R. A. KELLER

NSF-GP-4643
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2246 FIELD 7D, 7A,20J

BRANDEIS UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

KINETIC AND STRUCTURAL STUDIES BY MAGNETIC RESONANCE ABSORPTION

T. R. TUTTLE

NSF-GP-4577
5/65- 5/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2248 FIELD 20J, 7B

UNIV OF WISCONSIN, GRADUATE SCHOOL, CHEMISTRY, WISCONSIN

METAL-METAL BONDING

D. F. GAINES

NSF-GP-4566
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2249 FIELD 7B

MICHIGAN STATE UNIV, GRADUATE SCHOOL, CHEMISTRY, MICHIGAN

ELEMENTS OF SUBGROUPS IVA, VA AND VIA IN LOWER OXIDATION STATES

C. H. BRUBAKER

NSF-GP-4659
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2251 FIELD 7D

UNIVERSITY OF FLORIDA, GRADUATE SCHOOL, CHEMISTRY, FLORIDA

THE CHLORAMINATION REACTION

H. H. SISLER

NSF-GP-4505
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2252 FIELD 7A, 7D, 7B

UNIV OF MINNESOTA, GRADUATE SCHOOL, CHEMISTRY, MINNESOTA

RELAXATION STUDIES OF ACID-BASE EQUILIBRIA

S. BRICKENSTEIN

NSF-GP-4496
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2254 FIELD 7C, 7A, 7D

NORTHWESTERN UNIV, GRADUATE SCHOOL, CHEMISTRY, ILLINOIS

KINETICS OF THE CATALYTIC HYDROGENATION OF ALKENES

A. S. HUSSEY

NSF-GP-4656
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2256 FIELD 7C, 7D

UNIV OF THE PACIFIC, GRADUATE SCHOOL, CHEMISTRY, CALIFORNIA

NEW AMINOSUGAR SYNTHESES

H. K. ZIMMERMAN

NSF-GP-4587
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2257 FIELD 7C

NORTH TEXAS STATE UNIV, GRADUATE SCHOOL, CHEMISTRY, TEXAS

HALOGENATED KETENES

W. T. BRADY

NSF-GP-4628
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION .

GSP 2263 FIELD 7A, 7D

BOSTON COLLEGE, GRADUATE SCHOOL, CHEMISTRY, MASSACHUSETTS

FUSED INORGANIC MEDIA FOR PROMOTING ORGANIC REACTIONS

O. F. BENNETT

NSF-GP-4645
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GUE 131 FIELD 7C, 7A, 7D

A STUDY OF THE EFFECT OF SURFACE POTENTIAL ON SCALE FORMATION

H. P. SILVERMAN, F. ANSON, C. R. TOWNSEND
/66- /

INTERIOR-OFFICE OF SALINE WATER

GUE 147 FIELD 7D, 8H, 5C, 8E

KANSAS ST UNIV AGR SCI, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, KANSAS

OPTIMAL DESALINATION SYSTEMS

L. FAN, L. E. ERICKSON, C. HWANG
/66- /

INTERIOR-OFFICE OF SALINE WATER

GUW 334 FIELD 13B, 7C, 7D, 7B

AUBURN UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, ALABAMA

STUDY OF THE EFFECT OF SURFACTANTS ON THE AQUEOUS SOLUBILITY OF OXYGEN AND HYDROGEN AND HYDROGEN SULFIDE

R. H. DINIUS

INT-WR-B-001-ALA
10/65- 6/66

INTERIOR-OFFICE OF WATER RESOURCES

PRW 69 1 FIELD 7C, 7D,20J

BAYLOR UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

ORGANIC MONTMORILLONITES

J. L. MCATEE

QAA-110
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 70 1 FIELD 7C, 7D,20J

BAYLOR UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

RESTRICTED ROTATION STUDIES

A. G. PINKUS

QAA-111
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 73 1 FIELD 7C, 7A, 7D, 7B

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, TEXAS

THE ROLE OF SURFACE STRUCTURE IN HETEROGENEOUS CATALYSIS

W. H. WADE

F-114
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 75 1 FIELD 7C, 7A,20J,20C

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, TEXAS

MOLECULAR STRUCTURE STUDIES BY MEANS OF GAS-PHASE ELECTRON DIFFRACTION

M. I. DAVIS
F-116
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 78 1 FIELD 7C, 7D,20J, 7B

NORTH TEXAS STATE UNIV, GRADUATE SCHOOL, CHEMISTRY, TEXAS

COORDINATION OF ASYMMETRIC LIGANDS

B. E. BRYANT
B-119
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 84 1 FIELD 7D

BAYLOR UNIVERSITY, GRADUATE SCHOOL, TEXAS

HIGH RESOLUTION MASS SPECTROSCOPY AND GAS CHROMATOGRAPHY

E. C. HORNING

Q-125
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 85 1 FIELD 7C, 7D, 7A, 7B

BAYLOR UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

HYDROGEN PROCESSES AT SOLID ELECTRODES

T. C. FRANKLIN
QAA-103
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 86 1 FIELD 7C, 7D

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, CHEMISTRY, TEXAS

RELATIONSHIP BETWEEN CHEMICAL BEHAVIOR AND MOLECULAR STRUCTURE

M. J. DEWAR

F-126
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 88 1 FIELD 7A, 7B

TEXAS A + M UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

MECHANISM OF CHEMICAL PROCESSES IN FUSED SALTS AND AQUEOUS SOLUTIONS

F. R. DUKE

A-128
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 89 1 FIELD 7D,20J, 7B

TEXAS WOMANS UNIV, GRADUATE SCHOOL, TEXAS

MICROWAVE SPECTROSCOPY

L. C. SAMS
M-129
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 94 1 FIELD 7C, 7A, 7D

RICE UNIVERSITY, GRADUATE SCHOOL, CHEMISTRY, TEXAS

CHEMICAL BEHAVIOR OF IONS IN GASES

J. L. FRANKLIN

C-134
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PW 931 FIELD 7C, 7D, 7B

UNIV OF NORTH CAROLINA, GRADUATE SCHOOL, CHEMISTRY, NORTH CAROLINA

THE MAGNETIC AND SPECTRAL PROPERTIES OF VANADYL COMPLEXES WITH TRIDENTATE SCHIFF BASES

W. E. HATFIELD
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

UT 544 FIELD 7C, 7D, 7A

A STUDY OF THE ISOMERIZATION OF ALPHA OLEFINS DURING THE RITTER REACTION

T. F. MCGRATH
9/65- 8/66

RESEARCH CORP-WILLIAMS-WATERMAN FUND

ZPE 872 FIELD 7C, 7A, 7D

US, AEC, LOS ALAMOS, NEW MEXICO

SUBSTITUTED BENZHYDRYL BLOCKING GROUPS FOR TERMINAL PHOSPHATE IN THE CHEMICAL SYNTHESIS OF OLIGODEOXYRIBONUCLEOTIDES

D. L. WILLIAMS
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 877 FIELD 7C, 7D

US, AEC, LOS ALAMOS, NEW MEXICO

STEPWISE CHEMICAL SYNTHESIS OF TRIDEOXYRIBONUCLEOTIDES

D. E. HOARD, V. N. KERR, D. L. WILLIAMS
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 993 FIELD 20J, 5A, 7D

SOME THEORETICAL STUDIES ON THE ACTION OF IONIZING RADIATION ON ATOMS AND MOLECULES

M. INOKUTI
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1091 FIELD 7C, 7D, 7A, 7B

US, AEC, BERKELEY, CALIFORNIA

INTERACTIONS OF ACCELERATED CARBON IONS WITH ORGANIC COMPOUNDS
/66- /
R. M. LEMMON, W. ERWIN
AEC-BIOLOGY + MEDICINE

ZPE 1167 FIELD 7C, 7D,20M, 7B

MEMBRANE TRANSFER STUDIES
/66- /
J. S. ROBERTSON, R. STRAUB
AEC-BIOLOGY + MEDICINE

ZPE 1192 FIELD 7C, 7D,20J

ASSOCIATION OF MACROMOLECULES IN SOLUTION
/66- /
D. L. FILMER, E. T. ADAMS
AEC-BIOLOGY + MEDICINE

216-264 O - 66 - C

ZQF 284744 4 FIELD 7C, 7D, 7A,20J

USAF, AFSC, RTD, WRIGHT-PATT-AF MAT LAB, OHIO

RADIATION CHEMISTRY OF TRIPPLE BOND COMPOUNDS

R. E. RONDEAU
/65- /

DOD-AIR FORCE

ZQF 284799 1 FIELD 7C, 7A, 7D, 7B

USAF, AF ACADEMY, ACADEMY, COLORADO

HINDERED PHENOL PRODUCTS

C. K. ARPKE
/65- /

DOD-AIR FORCE

ZQF 284907 FIELD 7C,19D, 7A, 7D

USAF, AF ACADEMY, ACADEMY, COLORADO

A NEW KETONE SYNTHESIS FROM OLEFINS

H. REICH
/65- /

DOD-AIR FORCE

ZQF 284908 1 FIELD 7D, 7A, 7B

USAF, AF ACADEMY, ACADEMY, COLORADO

IDENTIFICATION OF THE ORTHONITRATE ION

L. A. KING
/65- /

DOD-AIR FORCE

ZQF 284911 FIELD 7D, 7A, 7B

USAF, AF ACADEMY, ACADEMY, COLORADO

THE INDIUM OXIDE - ANTIMONY OXIDE SYSTEM

J. C. SELSER
/65- /

DOD-AIR FORCE

ZQF 284912 FIELD 7C, 7D

USAF, AF ACADEMY, ACADEMY, COLORADO

APPROACHES TO THE SYNTHESIS OF A NON CLASSICAL CARBANION

C. J. CHEER
/65- /

DOD-AIR FORCE

ZUG 264 1 FIELD 7C, 7D, 9+,11C

USDI, BUR MINES, COLLEGE PK, MARYLAND

APPLICATION OF ULTRASONICS TO ELECTRODEPOSITION OF ALLOYS

F. D. LAMB, C. B. KENAHAN, D. SCHLAIN

INT-BM-4167-3
/65- /

INTERIOR-BUREAU OF MINES

ZUG 273 1 FIELD 7D,11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

RECOVERY OF NICKEL AND CADMIUM FROM BATTERY SCRAP

F. D. LAMB, H. S. CALDWELL
P. M. SULLIVAN, D. A. WILSON

INT-BM-4168-03
/65- /

INTERIOR-BUREAU OF MINES

ZUG 280 1 FIELD 7A, 7D,11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

ELECTROLYTIC REDUCTION OF ALUMINA

F. D. LAMB, C. B. KENAHAN, D. SCHLAIN

INT-BM-4168-10
/65- /

INTERIOR-BUREAU OF MINES

ZUG 281 1 FIELD 7D,11F,13H, 7B

USDI, BUR MINES, COLLEGE PK, MARYLAND

PRODUCTION OF HIGH-PURITY BASE METALS BY AMALGAM ELECTROLYSIS

F. D. LAMB, D. M. CHAMBERS
P. M. SULLIVAN

INT-BM-4168-11
/65- /

INTERIOR-BUREAU OF MINES

ZUG 286 1 FIELD 7D, 7A,20M,11F

USDI, BUR MINES, COLLEGE PK, MARYLAND

OXIDATION RATES OF MOLTEN BASE METALS AND ALLOYS

F. D. LAMB, P. M. SULLIVAN, D. A. WILSON

INT-BM-4168-16
/65- /

INTERIOR-BUREAU OF MINES

ZUG 287 1 FIELD 7D,20J, 7B

USDI, BUR MINES, COLLEGE PK, MARYLAND

DETERMINATION OF TRACE IMPURITIES IN HIGH-PURITY TUNGSTEN, MOLYBDENUM + BERYLLIUM BY CHEMICAL + X-RAY SPECTROGRAPHIC METHODS

F. D. LAMB, W. J. CAMPBELL, T. E. GREEN
J. W. THATCHER

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INTERIOR-BUREAU OF MINES

ZUG 318 2 FIELD 7D,21D, 7B

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SPECTROCHEMICAL ANALYSIS OF COAL ASH

F. D. LAMB, W. J. CAMPBELL
M. J. PETERSON

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INTERIOR-BUREAU OF MINES

08. Earth Sciences and Oceanography

SPE 1059 FIELD 7D, 8D, 8G, 7B

UNIV OF WISCONSIN, SCHOOL OF AGRICULTURE, SOIL + WATER SCIENCE, WISCONSIN

EXCHANGE OF LYOTROPIC SERIES CATIONS IN RELATION TO VERMICULITE SCROLLS ON MICA SURFACES
M. L. JACKSON, J. M. DEVILLIERS, V. VOLK

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AEC-BIOLOGY + MEDICINE

GJF 3208 3 FIELD 8K

SOUTHERN METHODIST, GRADUATE SCHOOL, GEOLOGY + GEOPHYSICS, TEXAS

STUDIES ON THE DETERMINATION OF SEISMIC EPICENTERS FOCAL DEPTHS AND MAGNITUDES

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RESEARCH IN GEOPHYSICS

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XAVIAR UNIVERSITY, GRADUATE SCHOOL, OHIO

A STUDY OF THE SEISMICITY OF THE CINCINNATI ARCH

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ARTIC INST OF NO AMER, CANADA

EFFECTS OF LOCATION OF SEISMOGRAPH STATIONS ON RECORDS OBTAINED

J. C. REED

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GQF 3813 1 FIELD 8K, 8G

UNIV OF ATHENS, GREECE

AFTER SHOCK SEQUENCE AND CRUSTAL STRUCTURE IN THE REGION OF GREECE
A. G. GALANOPOULOS

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GJF 4037 5 FIELD 8K, 8H

STUDY OF EARTH NOISE ON LAND AND SEA BOTTOM

F. GILBERT

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GJF 4380 FIELD 8F, 8K

TECHNICAL ADVISOR FOR MOBILE SEISMOLOGICAL OBSERVATORY

F. SCHALK

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GQF 4451 FIELD 8K

UNIVERSITY OF BERGEN, NORWAY

RESEARCH INTO THE SEISMOLOGY OF FENNOSCANDIA

O. M. SELLEVOLL

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INVESTIGATIONS ON THE NONELASTIC BEHAVIOR OF THE UPPER MANTLE

S. MUELLER

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TECTONIC FEATURES OF THE EARTHS CRUST AND UPPER MANTLE BY USE OF SEISMIC SURFACE WAVES

W. L. PILANT

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UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, GEOLOGY + MINERALOGY, MICHIGAN

ONSHORE-OFFSHORE SEISMIC EXPERIMENT

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GQF 6975 1 FIELD 8F, 8K, 5A

UNIVERSITY OF ALASKA, GRADUATE SCHOOL, GEOLOGY, ALASKA

FUNDAMENTAL AND APPLIED RESEARCH IN SEISMOLOGY IN ALASKA

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GQF 20548 FIELD 8K

GENERAL DYNAMICS CORP, SAN DIEGO, CALIFORNIA

PROPOSAL TO INVESTIGATE USE OF SEISMIC TECHNIQUES IN LOCATING UNDERGROUND CAVITIES

. NONE

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GQF 259402 FIELD 13B, 8F,12A, 8E

WOLF RES DEV CORP, MASSACHUSETTS

DEV COMPUTER PROGRAMS FOR USING INTEGRATED RANGE RATE DATA IN GLOBAL TRILATERATION PROGRAMS

H. R. KAHLER

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OREGON STATE UNIV, GRADUATE SCHOOL, OCEANOGRAPHY, OREGON

RESEARCH CONCERNING THE SEISMICITY OF OREGON

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PHOTOGRAPHIC RECONNAISSANCE OF EARTH SURFACE EFFECTS CAUSED BY UNDER GROUND NUCLEAR TEST ACTIVITY

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GQF 259494 3 FIELD 8G, 8K,12A, 8E

BOSTON COLLEGE, GRADUATE SCHOOL, MASSACHUSETTS

INST + MAIN OF DATA PROCESS SYSTEM + MACHINE ANAL OF SEISMIC SIGNALS FOR COVARIANCE + SPECTRAL COMP

J. F. DEVANE

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SHELL DEVELOPMENT CO, HOUSTON, TEXAS

RESEARCH DIRECTED TOWARD INVESTIGATION OF ROCK FAILURE AND DEFORMATION MECHANISMS IN TORSION TESTS

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RESEARCH TRIANGLE IN, NORTH CAROLINA

STUDY OF THE SEISMICITY OF THE SOUTHEASTERN UNITED STATES

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STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

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G. R. FOWLES

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GQF 550205 1 FIELD 8G, 8D

USDI, BUR MINES, DENVER, COLORADO

DEVELOPMENT OF CONTROLLED IMPULSE TECHNIQUE FOR INSITU TESTING OF ROCK

J. F. SHAW

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PERSPECTIVES IN OCEAN ENGINEERING

R. C. VETTER, C. L. BRETSCHNEIDER

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THE ORIGIN AND ENVIRONMENTAL SIGNIFICANCE OF THE CARBONATE FRACTION OF SOUTHERN U. S. ATLANTIC SHELF SEDIMENTS

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COMPOSITIONS OF CO-EXISTING ILLITE AND CHLORITE AT TWO DIAGENETIC GRADES

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DISTRIBUTION AND SOLUBILITIES OF TRACE ELEMENTS IN SULFIDE MINERALS

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CHEMICAL AND ISOTOPIC INVESTIGATIONS OF CASCADE ANDESITES AND ASSOCIATED ROCKS

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GEOCHEMISTRY OF THE KIGLAPAIT LAYERED INSTRUSION, LABRADOR

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DEEP DRILLING ON MIDWAY ISLAND

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POTASSIUM-ARGON METHOD OF DATING VOLCANIC ROCKS AND MINERALS, HAWAIIAN ISLANDS

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THE DIRECT MEASUREMENT OF TRANSPORT IN THE STRAITS OF FLORIDA AND ADJACENT CHANNELS

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CHRONOLOGY OF PHYSICAL EVENTS OF THE ALASKAN EARTHQUAKE

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COOPERATIVE ONSHORE-OFFSHORE SEISMIC EXPERIMENT

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IONIC FACTORS AFFECTING THE ORIGIN OF EXPANSIBLE CLAY MINERALS IN SOILS

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MINERALOGY, GEOCHEMISTRY, AND GENESIS OF THE IRON OKE DEPOSITS OF CHILE AND PERU

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GEOCHEMISTRY OF COAL LITHOTYPES

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COLUMBIA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

JOINT OCEANOGRAPHIC INSTITUTIONS DEEP EARTH SAMPLING - JOIDES - PROGRAM ON THE BLAKE PLATEAU

L. J. WORZEL

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3/65- 9/65

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PETROLOGIC INTERPRETATIONS OF MINERALS FROM IGNEOUS AND METAMORPHIC ROCKS

H. C. LIESE

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SEQUENTIAL MAPPING OF PALEOENVIRONMENTS OF THE PENNSYLVANIAN PERIOD

H. R. WANLESS

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3/65- 3/66

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WOODS HOLE OCEANOGRAPH, MASSACHUSETTS

COMPARATIVE GEOCHEMICAL STUDIES OF THE MAJOR ORGANIC CONSTITUENTS IN OCEAN WATERS AND SEDIMENTS

J. M. HUNT

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STANFORD UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, CALIFORNIA

DETECTION OF CREEP ON THE SAN ANDREAS FAULT

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A SEISMOLOGICAL AND VOLCANOLOGICAL STUDY OF MOUNT KATMAI

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WOODS HOLE OCEANOGRAPH, MASSACHUSETTS

AIR-SEA INTERACTION

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SEISMIC AND VOLCANIC INVESTIGATION IN THE KATMAI NATIONAL MONUMENT

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GSP 2167 FIELD 8D, 8G

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PETROGRAPHIC-STRATIGRAPHIC ANALYSIS OF ATOKA-LOWER DES MOINES INTERVAL, EASTERN GREAT BASIN

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PLEISTOCENE HISTORY OF WISCONSIN

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GSP 2169 FIELD 8D

YALE UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, CONNECTICUT

PALEOECOLOGY AND PALEONTOLOGY OF THE MOLLUSCAN FAUNAS OF THE INTERIOR CRETACEOUS

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GLACIAL CHRONOLOGY OF THE SOUTH-CENTRAL BROOKS RANGE, ALASKA

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GSP 2171 FIELD 8K, 8H

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EARTHQUAKE EFFECTS ON SHERMAN GLACIER, ALASKA

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REGIMEN OF THE MARTIN RIVER AND SIOUX GLACIERS, ALASKA

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GSP 2173 FIELD 8D, 8G

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STRUCTURAL VARIATION OF SILICA MINERALS, AND ALKALI FELDSPARE WITHIN SOME IGNEOUS AND METAMORPHIC ROCKS

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OREGON STATE UNIV, GRADUATE SCHOOL, OCEANOGRAPHY, OREGON

FRONTAL AND TIDAL CURRENTS ON THE CONTINENTAL SHELF

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COLUMBIA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

PLEISTOCENE OCEANOGRAPHY AS RECORDED IN DEEP-SEA SEDIMENTS

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ARCTIC INST OF NORTH, DIST OF COLUMBIA

EFFECTS ON GLACIERS OF ALASKAN EARTHQUAKE OF MARCH 1964

W. O. FIELD, R. H. EAGLE
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UNIVERSITY OF HAWAII, GRADUATE SCHOOL, GEOPHYSICS, HAWAII

GRAVITY CONTROL AIRPORT NETWORK IN UNITED STATES

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MASS INST OF TECHNOL, GRADUATE SCHOOL, METEOROLOGY, MASSACHUSETTS

RESEARCH IN OCEANIC PHYSICS

H. M. STOMMEL

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NSF-PHYSICAL SCIENCES DIVISION

GSP 2184 FIELD 8D, 8G, 8H

BERMUDA BIOL STATION, BERMUDA

EFFECTS OF SILICATE MINERALS ON OCEAN WATER COMPOSITION

R. M. GARRELS, R. *. GARRELS

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GSP 2185 FIELD 8N, 4A

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SPATIALLY COHERENT PROPERTIES OF GEOMAGNETIC MICROPULSATIONS

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GSP 2186 FIELD 8K, 8H

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COOPERATIVE ONSHORE-OFFSHORE SEISMIC EXPERIMENT

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GSP 2187 FIELD 8H

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INTERNATIONAL CONFERENCE ON TROPICAL OCEANOGRAPHY

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GSP 2188 FIELD 8H

UNIVERSITY OF MIAMI, GRADUATE SCHOOL, MARINE SCIENCE, FLORIDA

SUPPORT OF THE PLANNING OF THE JOINT OCEANOGRAPHIC INSTITUTIONS DEEP-EARTH SAMPLING - JOIDES

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10/64-10/65

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GSP 2189 FIELD 8N, 8G, 8H

UNIV OF WISCONSIN, GRADUATE SCHOOL, GEOLOGY, WISCONSIN

GRAVITY INVESTIGATIONS OF THE ARTIC OCEAN BASIN

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GSP 2211 FIELD 8F, 8G, 8H

UNIV OF CAL-LA JOLLA, GRADUATE SCHOOL, EARTH SCIENCES, CALIFORNIA

MORPHOLOGY AND STRUCTURE OF THE SEA FLOOR COMPARED WITH THE CONTINENTS

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GSP 2212 FIELD 8F, 8H

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STUDIES IN COASTAL LAGOONS

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GSP 2213 FIELD 8D, 8G

MASS INST OF TECHNOL, GRADUATE SCHOOL, GEOLOGY + GEOPHYSICS, MASSACHUSETTS

PARTITION OF ELEMENTS AMONG COEXISTING MINERALS

W. H. DENNEN
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GSP 2214 FIELD 3A, 8D, 8G

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COOPERATIVE ONSHORE-OFFSHORE SEISMIC EXPERIMENT

B. F. HOWELL

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OREGON OCEANOGRAPHIC STUDIES

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SEISMIC REFLECTION STUDIES OF THE BAHAMAS AND FLORIDA STRAITS

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OPERATIONAL SUPPORT OF OCEANOGRAPHIC RESEARCH VESSELS

G. P. WOLLARD

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GSP 2519 FIELD 8F, 8K, 8H

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, CERAMIC ENGINEERING, GEORGIA

COOPERATIVE ONSHORE-OFFSHORE SEISMIC EXPERIMENT

J. E. HUSTED, E. A. KAARSBERG

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3/65- 3/66

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UNIV OF CAL-LA JOLLA, GRADUATE SCHOOL, GEOPHYS + PLANET PHYS, CALIFORNIA

LONG WAVES AND TIDES

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UNIVERSITY OF HAWAII, GRADUATE SCHOOL, GEOPHYSICS, HAWAII

LOW-FREQUENCY SURFACE WAVES IN THE PACIFIC OCEAN

G. W. GROVES
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COLUMBIA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

METEORITE IMPACT CRATERS AT CAMPO DEL CIELO, ARGENTINA

W. A. CASSIDY
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UNIVERSITY OF UTAH, GRADUATE SCHOOL, GEOPHYSICS, UTAH

CONVERTED SEISMIC BODY-WAVE PHASES IN THE EARTHS CRUST AND UPPER MANTLE

K. L. COOK
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6/65- 6/66

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GSP 2524 FIELD 8D, 8G

COLUMBIA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW YORK

DEPENDENCE OF PHYSICAL PROPERTIES OF THE UPPER MANTLE ON CHEMICAL COMPOSITION OR PHASE

D. L. ANDERSON

NSF-GP-4437
4/65- 4/66

NSF-PHYSICAL SCIENCES DIVISION

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UNIVERSITY OF IDAHO, GRADUATE SCHOOL, GEOLOGY + GEOGRAPHY, IDAHO

GEOLOGY OF THE ST. JOE AREA, IDAHO

R. R. REID
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6/65- 6/66

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VILLANOVA UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, PENNSYLVANIA

MIDDLE AND UPPER ORDOVICIAN GRAPTOLITES, MOHAWK VALLEY, NEW YORK - ST. LAWRENCE LOWLAND, AND LAKE ST. JOHN AREA, CANADA

J. RIVA
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7/65- 7/66

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GSP 2528 FIELD 8G

UNIV OF CAL-RIVERSIDE, GRADUATE SCHOOL, GEOLOGY, CALIFORNIA

STRUCTURAL GEOLOGY, SANTA LUCIA RANGE, CALIFORNIA

K. J. HSU

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GEOLOGY AND GEOPHYSICS OF THE PENINSULAR RANGE PROVINCE, SOUTHERN AND BAJA, CALIFORNIA

R. G. CASTIL

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6/65-11/65

NSF-PHYSICAL SCIENCES DIVISION

GSP 2530 FIELD 8D, 8G, 8H

STRATIGRAPHIC FRAMEWORK OF RECENT CARBONATE SEDIMENTATION, BAHAMAS

H. J. WERNER, J. F. STORR

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NSF-PHYSICAL SCIENCES DIVISION

GSP 2531 FIELD 8F, 8G

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, GEOLOGY + GEOPHYSICS, CALIFORNIA

INTERRELATIONSHIPS AND RATES OF CRUSTAL PROCESSES IN MONO LAKE BASIN AREA, CALIFORNIA AND NEVADA

C. H. GILBERT, H. N. CHRISTENSEN

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NSF-PHYSICAL SCIENCES DIVISION

GSP 2532 FIELD 8F, 8G

UNIV OF SOUTH CAROLINA, GRADUATE SCHOOL, GEOLOGY, SOUTH CAROLINA

STRATIGRAPHY OF TERRACE SEDIMENTS, SOUTH ATLANTIC STATES

D. J. COLQUHOUN

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9/65- 9/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2533 FIELD 8G, 8H

UNIV OF ROCHESTER, GRADUATE SCHOOL, GEOLOGY + GEOGRAPHY, NEW YORK

PARTICLE ORIENTATION IN TURBIDITES

R. G. SUTTON
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7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2534 FIELD 8N, 8G

GRAD RES CTR OF S-WEST, TEXAS

GEOMAGNETIC VARIATIONS IN THE UPPER MANTLE

D. I. GOUGH, D. W. GOUGH

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NSF-PHYSICAL SCIENCES DIVISION

GSP 2535 FIELD 13B, 8F, 8G

UNIV OF CAL-LA JOLLA, GRADUATE SCHOOL, EARTH SCIENCES, CALIFORNIA

ASTROMETRIC MEASUREMENTS OF FAULT DISPLACEMENTS IN THE GULF OF CALIFORNIA

V. VACQUIER

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6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2536 FIELD 8F, 8G

RICE UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, TEXAS

GEOLOGY AND GEOPHYSICS OF THE PUERTO RICO-VIRGIN ISLANDS AREA

T. W. DONNELLY
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NSF-PHYSICAL SCIENCES DIVISION

GSP 2537 FIELD 8H

OREGON STATE UNIV, GRADUATE SCHOOL, OCEANOGRAPHY, OREGON

TEMPERATURE MICROSTRUCTURE AT THE OCEAN FLOOR

J. W. BERG, G. BODVARSSON, R. S. MESECAR

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UNIVERSITY OF ALASKA, GRADUATE SCHOOL, GEOPHYSICAL INST, ALASKA

THE EFFECT OF CONDUCTIVITY DISCONTINUITIES ON TELLURIC CURRENTS

D. W. SWIFT, E. M. WESCOTT
NSF-GP-4647
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2539 FIELD 8F, 8K, 8H

JOHNS HOPKINS UNIV, GRADUATE SCHOOL, GEOGRAPHY, MARYLAND

RIVER CHANNEL RESPONSE TO BASE LEVEL CHANGES RELATED TO ALASKAN EARTHQUAKE

M. KIRKBY, M. G. WOLMAN
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EARLY TERTIARY VOLCANIC ROCKS IN CENTRAL PUERTO RICO

E. G. LIDIAK

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STRUCTURAL FRAMEWORK OF THE SOUTHERN GREAT BASIN

B. C. BURCHFIEL

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6/65- 6/66

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GSP 2543 FIELD 8D, 8G

UNIV OF WISCONSIN, GRADUATE SCHOOL, GEOLOGY, WISCONSIN

LATE PALEOZOIC SEDIMENTATION AND STRUCTURE, OUACHITA GEOSYNCLINE, OKLAHOMA

L. M. CLINE
NSF-GP-4583
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2544 FIELD 8D, 8G

UNIV OF TEXAS, AUSTIN, GRADUATE SCHOOL, GEOLOGY, TEXAS

SEDIMENTARY PETROLOGY AND HISTORY OF PALEOZOIC OF THE MARATHON GEOSYNCLINE

E. F. MCBRIDE
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6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2545 FIELD 8G

PRINCETON UNIVERSITY, GRADUATE SCHOOL, GEOLOGY, NEW JERSEY

PETROLOGY, STRUCTURE, AND ORIGIN OF HIGHLY DIFFERENTIATED ALPINE OPHIOLITES

H. H. HESS, J. D. MAXWELL, E. M. MOORES
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GSP 2546 FIELD 8D, 8G

UNIV OF NOTRE DAME, GRADUATE SCHOOL, GEOLOGY, INDIANA

BIOSTRATIGRAPHY OF MADISON GROUP AND SAPPINGTON FORMATION, WESTERN MONTANA

R. G. GUTSCHICK
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6/65- 6/66

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GSS 507 FIELD 8D, 8F, 8G

UNIV OF WISCONSIN, GRADUATE SCHOOL, GEOGRAPHY, WISCONSIN

GEOMORPHOLOGY AND PLEISTOCENE STRATIGRAPHY OF THE KOM OMBO PLAIN, EGYPTIAN NUBIA AND THE KURKUR OASIS

K. W. BUTZER
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NSF-SOCIAL SCIENCES DIVISION

GUW 278 FIELD 7D, 8D, 8H, 8G

UNIVERSITY OF GEORGIA, GRADUATE SCHOOL, GEOLOGY, GEORGIA

DETERMINATION OF THE CONTENT AND BEHAVIOR OF SPECIFIC TRACE CATIONS IN GROUND AND SURFACE WATERS
C. A. SALOTTI, J. A. FOUTS

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INTERIOR-OFFICE OF WATER RESOURCES

GUW 391 FIELD 8H

INSTRUMENTATION AND DEVELOPMENT OF TECHNIQUES TO MEASURE AND EVALUATE METEOROLOGICAL PROBLEMS IMPORTANT TO HYDROLOGY
D. G. CHADWICK, G. L. ASHCROFT
P. E. BULLER, J. E. FLETCHER
D. L. GRIFFIN
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INTERIOR-OFFICE OF WATER RESOURCES

GUW 395 FIELD 8F, 8H

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, GEOLOGY, ILLINOIS

GEOLOGIC CONTROLS ON GROUNDWATER DISCHARGE IN SELECTED SMALL STREAM BASINS IN ILLINOIS

R. N. FARVOLDEN
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INTERIOR-OFFICE OF WATER RESOURCES

GUW 396 FIELD 8F, 8H

UNIVERSITY OF ILLINOIS, SCHOOL OF AGRICULTURE, AGRIC ENGINEERING, ILLINOIS

DEVELOPMENT OF DRAINAGE ASSESSMENT PROCEDURES BASED ON PHYSICAL FEATURES IN ILLINOIS

B. A. JONES, C. J. DRABLOS, J. C. HEADLEY
A. G. MUELLER, R. T. ODELL
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ZQF 260155 FIELD 8G,20J

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

INSTRUMENTATION FOR GEODESY AND GRAVITY

B. SZABO
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DOD-AIR FORCE

ZTA 335 FIELD 8F, 8G, 8H

US, SMITHSONIAN INST, DIST OF COLUMBIA

EVOLUTIONARY DEVELOPMENT OF CUSPATE FORELANDS

J. W. PIERCE
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SMITHSONIAN INSTITUTION

ZUA 683 3 FIELD 8D, 8H, 8G

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PERMEABILITY DISTRIBUTION AND SEDIMENTATIONAL FEATURES

J. BREDEHOEFT
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INTERIOR-GEOLOGICAL SURVEY

ZUA 686 3 FIELD 7D, 8D, 8H,20D

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MINERALOGIC CONTROLS ON CHEMISTRY OF GROUND WATER
B. B. HANSHAW
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INTERIOR-GEOLOGICAL SURVEY

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GLACIOLOGICAL RESEARCH
M. F. MEIER
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INTERIOR-GEOLOGICAL SURVEY

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CHANNEL LOSSES
R. F. HADLEY
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INTERIOR-GEOLOGICAL SURVEY

ZUA 719 3 FIELD 8H, 8G,12A, 8E

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INTERSTITIAL GEOMETRY OF POROUS MEDIA

J. G. FERRIS

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INTERIOR-GEOLOGICAL SURVEY

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PERMEABILITY OF FRACTURED ROCKS

F. W. TRAINER

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INTERIOR-GEOLOGICAL SURVEY

ZUA 733 2 FIELD 8F, 8H

USDI, GEOL SURV, DIST OF COLUMBIA

BASIC RESEARCH IN GEOMORPHOLOGY AND HYDROLOGY

C. W. CARLSTON

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INTERIOR-GEOLOGICAL SURVEY

ZUA 763 1 FIELD 8H, 8C,12A, 8F

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UNSTEADY FLOW AND SALINE INTRUSION IN ESTUARIES

R. A. BALTZER

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INTERIOR-GEOLOGICAL SURVEY

ZUA 776 1 FIELD 13G, 8H

USDI, GEOL SURV, DIST OF COLUMBIA

HYDROLOGY OF HUNGRY HORSE RESERVOIR, MONTANA

M. I. RORABAUGH

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INTERIOR-GEOLOGICAL SURVEY

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USDI, GEOL SURV, DIST OF COLUMBIA

THERMAL CHARACTERISTICS OF AQUIFER SYSTEMS

R. SCHNEIDER
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INTERIOR-GEOLOGICAL SURVEY

ZUA 782 1 FIELD 13B, 8G

USDI, GEOL SURV, DIST OF COLUMBIA

TRANSPORT PROPERTIES OF NATURAL CLAYS

R. G. WOLFF
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INTERIOR-GEOLOGICAL SURVEY

ZUA 794 1 FIELD 8K, 8H, 8E,12A

USDI, GEOL SURV, DIST OF COLUMBIA

MECHANICS OF GROUND-WATER FLOW

H. H. COOPER, I. S. PAPADOPULOS

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INTERIOR-GEOLOGICAL SURVEY

ZUA 787 1 FIELD 8H, 8G

USDI, GEOL SURV, DIST OF COLUMBIA

KINEMATICS OF PARTICLE MOVEMENT OVER RIPPLES AND DUNES

A. V. JOPLING

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INTERIOR-GEOLOGICAL SURVEY

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PROTOTYPE ANALOG MODEL OF WESTERN LONG ISLAND

N. M. PERLMUTTER, L. FRANCKE

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INTERIOR-GEOLOGICAL SURVEY

ZUA 799 1 FIELD 8D, 8F, 8H, 8G

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HYDROGEOLOGY OF ARTESIAN SYSTEMS AND LIMESTONE TERRANES

V. T. STRINGFIELD

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INTERIOR-GEOLOGICAL SURVEY

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USDI, GEOL SURV, DIST OF COLUMBIA

GRAIN SIZE DISTRIBUTION AND BEDLOAD TRANSPORT

G. P. WILLIAMS, L. B. LEOPOLD

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INTERIOR-GEOLOGICAL SURVEY

09. Electronics and Electrical Engineering

SH 746 1 FIELD 3A, 3B,20F

UNIV OF TEXAS, AUSTIN, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, TEXAS

RESEARCH ON MILLIMETER-WAVELENGTH RADIATION FROM SOLAR BODIES

C. W. TOLBERT

NASA-NSG-432-SI-3
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GQF 3278 3 FIELD 5C

RENSSELAER POLYTC INST, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

MATHEMATICAL PROGRAMMING

C. E. LEMKE

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DOD-AIR FORCE

GQF 3726 1 FIELD 12A, 9D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, ILLINOIS

INFORMATION COMMUNICATION MANY-VALUED LOGIC AND MEANING

G. GUNTHER

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GQF 3746 1 FIELD 12A, 9D, 5C

STATE UNIV N Y STONY, GRADUATE SCHOOL, NEW YORK

CONTROL SYSTEMS RESEARCH

S. S. CHANG

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RESEARCH TRIANGLE IN, NORTH CAROLINA

INVESTIGATIONS IN THE THEORY OF INFORMATION AND STOCHASTIC PROCESSES

M. R. LEADBETTER

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DOD-AIR FORCE

GQF 4529 FIELD 12A, 9D

GEORGE WASHINGTON UNIV, GRADUATE SCHOOL, STATISTICS, DIST OF COLUMBIA

INFORMATION THEORY STATISTICAL APPLICATIONS

S. KULLBACK

AF-AFOSR-0932-65
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GQF 259036 FIELD 9+,12A

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

EFFORT ON MATH DESCRIPTION OF + USAGE OF ITERATED CELLULAR ARRAYS FOR LOGIC + STORAGE FUNCTIONS

R. C. MINNICK
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POLYTECH INST BROOKLYN, SCHOOL OF ENGINEERING, ELECTROPHYSICS, NEW YORK

UNCONVENTIONAL NETWORK THEORY

H. J. CARLIN

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GQF 550207 FIELD 9+,12A, 5C, 9C

DEVELOPMENT OF AN AUTOMATIC COMPUTATIONAL DEVICE FOR SOLVING CONTINUUM MECHANICS PROBLEMS

J. TRULIO

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GSE 794 FIELD 9+,12A,13M

UNIV OF CAL-L. A., SCHOOL OF ENGINEERING, ENGINEERING, CALIFORNIA

HYBRID COMPUTATION

W. J. KARPLUS, J. J. VIDAL

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2/65- 2/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 844 FIELD 9+,12A

UNIV OF PENNSYLVANIA, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, PENNSYLVANIA

NEIGHBOR CONCEPT OF DATA STORAGE

H. J. GRAY

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NSF-ENGINEERING SCIENCES DIVISION

GSP 2315 FIELD 12A, 9D

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, DIGITAL COMPUTER LAB, ILLINOIS

NUMERICAL METHODS, COMPUTER ARITHMETIC AND ARTIFICIAL LANGUAGE

D. B. GILLIES, C. W. GEAR
J. E. ROBERTSON

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NSF-PHYSICAL SCIENCES DIVISION

GSP 2328 FIELD 12A, 9D

WASHINGTON STATE UNIV, GRADUATE SCHOOL, MATHEMATICS, WASHINGTON

COMPUTER LANGUAGE FOR FORMULAR RETRIEVAL

R. M. STARK, R. *. STARK

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NSF-PHYSICAL SCIENCES DIVISION

GSP 2363 FIELD 12A

UNIVERSITY OF MICHIGAN, GRADUATE SCHOOL, MATHEMATICS, MICHIGAN

AUTOMATIC PROGRAMMING

J. A. GALLER

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NSF-PHYSICAL SCIENCES DIVISION

LAD 11 2 FIELD 12A, 9D

SYSTEMS DEVELOP CORP, CALIFORNIA

THEORY OF PROGRAMMING LANGUAGES

S. GINSBURG,*T. N. HIBBARD, G. F. ROSE

TM-530-008-0011
/65- /

SYSTEM DEVELOPMENT CORPORATION

LAD 51 FIELD 12A, 9D

SYSTEMS DEVELOP CORP, CALIFORNIA

LIST-PROCESSING LANGUAGES

S. Y. SEDELOW, D. B. BOBROW, J. FELDMAN
S. S. SHAFFER, L. E. TRAVIS

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SYSTEM DEVELOPMENT CORPORATION

ZQF 260539 FIELD 9+, 9A,20J

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E M THEORY APPLIED TO ANTENNAS AND SCATTERING

F. J. ZUCKER
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10. Energy Conversion (Non-propulsive)

SH 443 1 FIELD 7D, 9C

UNIV OF PENNSYLVANIA, GRADUATE SCHOOL, CHEMISTRY, PENNSYLVANIA

STUDIES OF THE FUNDAMENTAL CHEMISTRY, PROPERTIES AND BEHAVIOR OF FUEL CELLS

J. O. BOCKRIS

NASA-325-E-1
10/63- 9/64

NASA

GI 67 FIELD 20M, 9C, 9A,10B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

EXTENDED SURFACE THERMIONIC SYSTEMS

S. L. SOO, S. G. QUINTELLA

7/64- 6/65

STATE-UNITED STATES DEPT OF

11. Materials

SH 1586 5 FIELD 7C, 7D, 5A,20M

RENSSELAER POLYTC INST, GRADUATE SCHOOL, CHEMISTRY, NEW YORK

INTERDISCIPLINARY MATERIALS RESEARCH

S. E. WIBERLEY, G. S. ANSELL
R. A. BAILEY, W. H. BAUER
F. W. BILLMEYER, P. A. CASABELLA
W. J. CHILDS

NASA-NSG-100-E-4
5/65- 4/66

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GPF 905 FIELD 11F,11G, 5A,20F

MASS INST OF TECHNOL, GRADUATE SCHOOL, PHYSICS, MASSACHUSETTS

X-RAY MEASUREMENT OF FREQUENCY SPECTRUM OF GOLD

B. E. WARREN

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AEC-DIVISION OF PHYSICAL RES

GSC 799 FIELD 20L,20D,10B

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, NEW YORK

BEHAVIOR AND STABILITY OF BEARING LUBRICANT FILMS UNDER DYNAMIC LOADING

F. W. OCVIRK, J. F. BOOKER

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3/65-10/66

NSF-ENGINEERING SCIENCES DIVISION

ZUG 269 1 FIELD 11F,13M,20C,20L

USDI, BUR MINES, COLLEGE PK, MARYLAND

THERMOELECTRIC MATERIALS RESEARCH

F. D. LAMB, L. D. NORMAN, M. J. SPENDLOVE

INT-BM-4167-8
/65- /

INTERIOR-BUREAU OF MINES

ZUG 270 1 FIELD 7D, 7C,20M,11B

USDI, BUR MINES, COLLEGE PK, MARYLAND

PHYSICAL PROPERTIES OF NONMETALLIC REFRACTORIES

F. D. LAMB, W. J. CAMPBELL
L. P. DOMINGUES, L. R. FURLONG
E. E. MAUST

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INTERIOR-BUREAU OF MINES

12. Mathematical Sciences

GQF 76 9 FIELD 12A

WAKE FOREST CULLEGE, GRADUATE SCHOOL, NORTH CAROLINA

BOUNDS FOR CHARACTERISTIC ROOTS OF MATRICES

A. T. BRAUER
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/65- /

DOD-AIR FORCE

GQF 511 8 FIELD 12A

JOHNS HOPKINS UNIV, GRADUATE SCHOOL, MATHEMATICS, MARYLAND

EXISTENCE IN PROPERTIES OF SOLUTIONS OF DIFFERENTIAL EQUATIONS

P. HARTMAN
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GQF 785 7 FIELD 12A

CASE INST OF TECHNOL, GRADUATE SCHOOL, MATHEMATICS, OHIO

ORDER STATISTICS AND NON-PARAMETRIC ANALYSIS
F. C. LEONE
AF-AFOSR-0280-63
/65- /
DOD-AIR FORCE

GQF 1237 5 FIELD 12A

MCDONNELL AIRCRAFT CO, MISSOURI

RESEARCH ON INTERPOLATION WITH POLYNOMIALS TO BOUNDARY VALUES

J. H. CURTISS
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DOD-AIR FORCE

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UNIV OF CAL-L. A., GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

REGRESSION CURVES AND STATISTICAL TESTS

P. G. HOEL
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DOD-AIR FORCE

GQF 3247 3 FIELD 12A

STANFORD UNIVERSITY, GRADUATE SCHOOL, CALIFORNIA

FUNCTION-THEORETIC METHODS IN STOCHASTIC PROCESSES

R. C. CHUNG

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DOD-AIR FORCE

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SELECTED PROBLEMS IN APPROXIMATION THEORY

P. PORCELLI

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GQF 3401 2 FIELD 12A

WEST VIRGINIA UNIV, SCHOOL OF ENGINEERING, AEROSPACE ENGINEERING, WEST VIRGINIA

APPLICATION OF NUMERICAL QUADRATURE IN APPLIED MATHEMATICS

W. SQUIRE

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DOD-AIR FORCE

GQF 3603 2 FIELD 12A

MCDONNELL AIRCRAFT CO, MISSOURI

THEORY OF MACHINES

J. D. MCKNIGHT

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DOD-AIR FORCE

GQF 3667 3 FIELD 12A

UNIV OF CAL-SANTA BARB, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

SOME PROBLEMS IN MATRIX THEORY

H. MINC

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/65- /

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GQF 3701 2 FIELD 12A

NORTHWESTERN UNIV, GRADUATE SCHOOL, MATHEMATICS, ILLINOIS

PROBABILITY AND STATISTICS

M. DWASS

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PURDUE UNIVERSITY, GRADUATE SCHOOL, MATHEMATICAL SCIENCES, INDIANA

CONTROL THEORY AND DIFFERENTIAL EQUATIONS

L. D. BERKOVITZ, R. A. GAMBILL
J. C. LILLO

NSF-GP-4245
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2415 FIELD 12A

STANFORD UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

FUNCTIONAL ANALYSIS

R. S. PHILLIPS, Y. KATZNELSON, H. KOMATSU

NSF-GP-4164
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2416 FIELD 12A

UNIV OF CAL-BERKELEY, GRADUATE SCHOOL, MATHEMATICS, CALIFORNIA

GEOMETRY, TOPOLOGY AND GROUP THEORY

S. S. CHERN, G. BREDON, R. BROWN, I. FARY
P. FONG, G. HOCHSCHILD, A. OGG

NSF-GP-3990
1/65- 1/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2417 FIELD 12A

CORNELL UNIVERSITY, GRADUATE SCHOOL, MATHEMATICS, NEW YORK

DIFFERENTIAL EQUATIONS AND APPLICATIONS

L. E. PAYNE, A. A. BONIC, J. M. CHAIKEN
J. EELLS, W. G. FARIS

NSF-GP-4216
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2418 FIELD 12A

NORTHWESTERN UNIV, GRADUATE SCHOOL, MATHEMATICS, ILLINOIS

DIFFERENTIAL GEOMETRY

R. HERMAN

NSF-GP-4272
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

LAD 24 1 FIELD 12A, 5C

SYSTEMS DEVELOP CORP, CALIFORNIA

STATISTICAL METHODS IN OPERATIONS RESEARCH

A. V. GAFARIAN, E. L. PUGH, J. E. WALSH

TM-530-007-0024
/64- /

SYSTEM DEVELOPMENT CORPORATION

LAD 25 1 FIELD 12A

SYSTEMS DEVELOP CORP, CALIFORNIA

MONTE CARLO TECHNIQUE

C. E. CLARK, E. L. PUGH

TM-530-007-0025
/64- /

SYSTEM DEVELOPMENT CORPORATION

ZQA 41 FIELD 12A

USA, ORD CORPS, WATERVLIET ARSNL, NEW YORK

LINEAR AND NON-LINEAR ALGEBRAIC AND TRANSCENDENTAL EQUATIONS

M. PASCUAL

/65- /

ARMY-ORDNANCE ARSENAL-FRANKFORD, PHILADE

13. Mechanical, Industrial, Civil, and Marine Engineering

7GX 1165 3 FIELD 13B, 8H

SYRACUSE UNIVERSITY, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, NEW YORK

TRANSVERSE DISPERSION OF CONTAMINANT IN GROUNDWATER

W. LI, R. CANALE, W. ELY, D. LAI
7-WP-00575-03
9/65- 8/66

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7GX 1644 7 FIELD 13B, 7D

UNIV OF CINCINNATI, SCHOOL OF ENGINEERING, CHEMICAL + METAL ENGIN, OHIO

FOAM FRACTIONATION WITH REFLUX

R. LEMLICH, F. SHIH
7-WP-00161-07
9/65- 8/66

PHS-BSS

7GX 3128 2 FIELD 13B, 7C, 7D, 7B

UNIV OF SOUTH CAROLINA, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, SOUTH CAROLINA

PURIFICATION OF INDUSTRIAL WASTE BY ION EXCHANGE
M. W. DAVIS
7-WP-00595-02
9/65- 8/66

PHS-BSS

5H 572 2

BATTELLE MEMORIAL IN, OHIO

ASSIST IN THE NASA INDUSTRIAL APPLICATIONS PROGRAM
H. R. BATCHELDER

NASA-NASR-100(02)-S
4/64- 2/65

NASA

GSE 801 FIELD 10B

OKLAHOMA STATE UNIV, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, OKLAHOMA

MOBILITY CRITERIA OF A SIX-REVOLUTE SIX-BAR SPACE MECHANISM
NSF-GK-172 L. HARRISBERGER
3/65- 3/66

NSF-ENGINEERING SCIENCES DIVISION

GUN 316 FIELD 13G,20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

INFLUENCE OF TURBULENCE ON SURFACE REAERATION

E. R. HOLLEY
INT-WR-A-001-ILL
7/65- 9/66

INTERIOR-OFFICE OF WATER RESOURCES

GUN 328 FIELD 7A, 7D,20M, 8D

PENNSYLVANIA ST UNIV, SCHOOL OF MINERAL IND, GEOCHEM + MINERALOGY, PENNSYLVANIA

THERMODYNAMICS OF REACTIONS IN ACID MINE DRAINAGE

H. L. BARNES, S. B. ROMBERGER

INT-WR-B-003-PA
7/65- 7/66

INTERIOR-OFFICE OF WATER RESOURCES

GVE 620053 3 FIELD 7C, 7D, 8D, 8H

ISR INST OF TECHNOLOGY, ISRAEL

USE OF COAGULANTS TO REMOVE SUSPENDED MATTER FROM WATER

A. M. WACHS, M. REBHUN, A. *. WACHS
AGF-A-10-SWC-0025
/66- /

AGRICULTURE-DEPT OF AGRICULTURE

NIS 3 FIELD 13B, 7D,10B

IOWA ST UNIV SCI TECH, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, IOWA

OXYGEN TRANSFER EFFICIENCY OF A BLADED ROTOR

E. R. BAUMANN, J. L. CLEASBY
/66- /

IOWA STATE UNIVERSITY

XZ 889 FIELD 13B

UNIV OF MANITOBA, SCHOOL OF MEDICINE, MICROBIOLOGY, CANADA

AN INVESTIGATION OF THE BIOLOGICAL AND PHYSICAL BEHAVIOUR OF SEWAGE LAGOONS UNDER A CLIMATE OF TEMPERATURE EXTREMES

H. LEES

606-7-89
7/65- 6/66

CANADA-DEPT OF NATL HEALTH + WELFARE

YIL 292 FIELD 13B,13F, 7B

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

USE OF ADMIXTURES FOR CHEMICAL - AND PHYSICO-CHEMICAL - STABILIZATION OF NATURAL SOILS FOR ROAD BUILDING

T. H. THORNBURN, C. H. HURLEY
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STATE-ILLINOIS

ZPE 921 FIELD 13B, 7D, 7C,19D

US, AEC, BERKELEY, CALIFORNIA

AQUATIC TRANSPORT OF NUCLEAR DEBRIS

A. R. TAMPLIN, C. A. BURTON, L. H. FISHER Y. C. NG

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AEC-BIOLOGY + MEDICINE

ZUA 790 1 FIELD 13G,12A,13M,20D

USDI, GEOL SURV, DIST OF COLUMBIA

FLUID RESISTANCE AT EXPANSIONS AND CONTRACTIONS

I. YOTSUKURA

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INTERIOR-GEOLOGICAL SURVEY

ZUG 268 1 FIELD 7A,11B,11F,13H

USDI, BUR MINES, NORRIS, TENNESSEE

HORIZONTAL ZINC RETORTS

F. D. LAMB, N. A. PACE, M. E. TYRRELL

INT-BM-4167-7
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INTERIOR-BUREAU OF MINES

ZUG 271 1 FIELD 11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

ELECTROSTATIC AND MAGNETIC SEPARATION

F. D. LAMB, F. FRAAS, M. J. SPENDLOVE

INT-BM-4168-01
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INTERIOR-BUREAU OF MINES

ZUG 277 1 FIELD 11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

SEPARATION OF METALS BY CEMENTATION

F. D. LAMB, C. B. KENAHAN, D. SCHLAIN

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INTERIOR-BUREAU OF MINES

ZUG 283 1 FIELD 8D,11F,13H

USDI, BUR MINES, COLLEGE PK, MARYLAND

MANGANESE AND ALUMINA PROCESS EVALUATION AND RESEARCH

F. D. LAMB, R. C. KIRBY, M. J. SPENDLOVE

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/65- /

INTERIOR-BUREAU OF MINES

14. Methods and Equipment

GQF 259003 FIELD 12A

WOLF RES DEV CORP, MASSACHUSETTS

APPL VARIOUS CLASSES OF DYNAMIC ATTRIBUTE EXTRACTION TECHS TO REALTIME SENSOR MEAS DATA REDUCTION
D. BRZEZENSKI

AF-19-628-04392
/65- /

DOD-AIR FORCE

15. Military Sciences

GQF 284923 FIELD 19+,15G

STUDY OF DEFENSE AGAINST ATTACK BY BALLISTIC MISSILES

H. R. HESSE
AF-29-600-05149
/65- /

DOD-AIR FORCE

17. Navigation, Communications, Detection, and Countermeasures

GH 349 4 FIELD 17G,14E

SOC PHOTOGRAPHIC SCIEN, DIST OF COLUMBIA

CONDUCT VOLUNTEER PHOTOGRAPHIC TRACKING PROGRAM

. NONE

NASA-NSG-35-ST-1
12/63-12/64

NASA

GQF 3129 3 FIELD 3B, 4A

CORNELL UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NEW YORK

IONOSPHERIC PHYSICS RADAR RADIO ASTRONOMY

W. E. GORDON

AF-49-638-01156
/65- /

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GQF 259029 1 FIELD 9+, 9D, 5C, 9C

RESEARCH STUDY ON MULTIPLE ALTERNATIVE COMMUNICATIONS TECHNIQUES TO REDUCE ERROR +REDUNDANCY

W. B. FLOYD

AF-19-628-04081
/65- /

DOD-AIR FORCE

ZKD 1 1 FIELD 17B, 9C, 9+,22C

US, FED AV AGCY, SYST RES + DEV SERV, DIST OF COLUMBIA

DATA CONTROL AND SUPERVISION - EQUIPMENT DEVELOPMENT

J. F. SCHROEDER

FAA-RD-203-2-0
/65- /

FAA-SYSTEMS RES + DEVEL SERVICE

18. Nuclear Science and Technology

GPE 805 1 FIELD 5A,18A,20F,20L

LEHIGH UNIVERSITY, GRADUATE SCHOOL, PHYSICS, PENNSYLVANIA

ROLE OF THE THALLIUM DIMERIN THE NAI TE SCINTILLATION PROCESS

M. J. VANSCIVER, R. D. FOUCHAUX

AT(30-1)3408
6/65- 6/66

AEC-BIOLOGY + MEDICINE

GPF 50 3 FIELD 18A,20H, 7D, 7B

UNIVERSITY OF MARYLAND, GRADUATE SCHOOL, PHYSICS + ASTRONOMY, MARYLAND

THE STRUCTURE OF THE LIGHT NUCLEI

W. F. HORNYAK, P. CONNORS, H. D. HOLMGREN J. B. MARION, R. MEAD, C. MOAZED Y. L. ROUSH

AT(40-1)2098
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AEC-DIVISION OF PHYSICAL RES

GPF 776 1 FIELD 18A, 7D, 7B

PURDUE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, INDIANA

RESEARCH IN NUCLEAR PHYSICS

R. M. STEFFEN, Z. W. GRABOWSKI
S. M. HARRIS, O. E. JOHNSON, B. T. LUCAS
R. L. RASERA, R. P. SCHARENBERG

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AEC-DIVISION OF PHYSICAL RES

ZPE 920 FIELD 8D,18A

US, AEC, BERKELEY, CALIFORNIA

ISOTOPIC AND ELEMENTAL COMPOSITION OF RADIOACTIVE FALLOUT PARTICLES

R. E. HEFT, W. A. PHILLIPS, H. R. RALSTON
W. A. STEELE
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 924 FIELD 4A,12A, 8E

US, AEC, BERKELEY, CALIFORNIA

PREDICTION OF FALLOUT HOT SPOTS FROM TROPOSPHERIC CLOUDS ORIGINATING FROM NUCLEAR EXPLOSIONS

L. H. FISHER, C. A. BURTON
A. H. PETERSEN
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 946 FIELD 18A, 7B

US, AEC, BERKELEY, CALIFORNIA

FAST AND HIGH ENERGY NEUTRON SPECTROSCOPY IN OCCUPIED OMNIDIRECTIONAL NEUTRON RADIATION FIELDS NEAR ACCELERATORS

R. WALLACE
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 947 FIELD 18A,20H, 7D

US, AEC, BERKELEY, CALIFORNIA

RADIATION DOSIMETRY OF RADIATION FIELDS CONSISTING OF NEUTRONS WITH ENERGIES ABOVE 20 MEV

R. WALLACE
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 995 FIELD 7C, 5A,18A,20H

SPECIFIC PRIMARY IONIZATION BY BETA RAYS

F. F. RIEKE
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 999 FIELD 5A,18A

THE PRIMARY ACTION OF IONIZING RADIATION

R. L. PLATZMAN
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1193 FIELD 5A,18A,20H

US, AEC, OPER OFFICE, NEW YORK

RADIATION CALIBRATION FACILITY

J. E. MCLAUGHLIN, W. CONDON, A. SHAMBON
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AEC-BIOLOGY + MEDICINE

ZPE 1196 FIELD 5A,18A,20H, 7D

US, AEC, OPER OFFICE, NEW YORK

HIGH ENERGY DOSIMETRY

J. E. MCLAUGHLIN, H. BECK, K. OBRIEN
R. SANNA
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1347 FIELD 6B, 9+,18A,20H

NEUTRON THRESHOLD DETECTOR EVALUATION

J. A. SAYEG, W. QUAM
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1349 FIELD 8G,18A,20H, 7D

STUDIES OF THEORETICAL FACTORS AFFECTING AERIAL MEASUREMENTS

H. A. LAMONDS, J. E. HAND, J. A. MICHAEL
E. J. STORY
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1352 FIELD 8G,12A, 8E,20H

AERIAL RADIOLOGICAL SURVEY CALIBRATION RANGE DESIGN

H. A. LAMONDS, J. A. MICHAEL, E. J. STORY

6 1/66
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1353 FIELD 18A,20H, 7D, 7B

EDGERTON GERMESHAUSEN, + GRIER, LAS VEGAS, NEVADA

NEUTRON DOSE AND GAMMA EXPOSURE MEASUREMENTS IN AIR FROM A POINT ISOTROPIC 14 MEV NEUTRON SOURCE

Z. G. BURSON, E. F. BLASE, H. C. BRILL
A. E. FRITZSCHE, P. A. HAWKINS
J. R. MAGAW, F. C. STELTER
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1356 FIELD 4A,18A, 7B

AIR-GROUND CORRELATION MEASUREMENTS OF FISSION PRODUCT FALL-OUT

E. J. STORY, Z. BURSON
/66- /

AEC-BIOLOGY + MEDICINE

ZPE 1444 FIELD 8D, 5A,18A

FALLOUT PHENOMENOLOGY

J. J. FUQUAY, K. H. LARSON, E. W. MILLER
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AEC-BIOLOGY + MEDICINE

19. Ordnance

SQA 1 FIELD 10B,15G

STUDY 105MM AND 155MM RAPID FIRE WEAPONS SYSTEM
/65- /
T. B. MONSON, W. H. SCUDDER
DOD-ARMY

SQA 2 1 FIELD 15C,15G

CHRYSLER CORP DETROIT, MICHIGAN

AUGMENTED ARTILLERY WEAPON SYSTEM
B. STANAITIS
DOD-ARMY /65- /

SQA 192 FIELD 15G

GENERAL MOTORS CORP, SANTA BARBARA, CALIFORNIA

CONSTRUCTION AND TEST OF A CONTROLLED REACTION WEAPON

S. L. BUCKAY, J. R. SALONIMER

DA-30-144-AMC-940-W
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DOD-ARMY

SQF 3181 3 FIELD 7C,19D,21B, 7D

STANFORD RESEARCH INST, MENLO PARK, CALIFORNIA

DETONATION CHARACTERISTICS OF LOW DENSITY GRANULAR MATERIALS

M. EVANS

AF-49-638-01124
/65- /

DOD-AIR FORCE

20. Physics

TGX 1210 2 FIELD 20D

GEORGIA INST OF TECH, SCHOOL OF ENGINEERING, CHEMICAL ENGINEERING, GEORGIA
A STUDY OF VIBRATING CAPILLARY ATOMIZERS

C. ORR, E. E. WEAVER
7-AP-00351-02
10/65- 9/66

PHS-BSS

GH 659 1 FIELD 20I

UNIV OF ROCHESTER, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, NEW YORK

A PILOT STUDY OF PLASMA STREAM AND TRAVELING WAVE MAGNETIC FIELD INTERACTION

M. LESSEN
NASA-NSG-350-P-1
2/64- 2/65

NASA

GH 974 4 FIELD 20D

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, MECHANICAL + IND ENGIN, ILLINOIS

INVESTIGATION OF THE FLOW AND HEAT TRANSFER CONDITIONS WITHIN SEPARATED FLOW REGIONS
H. M. KORST, A. L. ADDY, E. L. BALES
M. L. CHOW, R. H. HOWELL, R. A. WHITE
P. S. YEH

NASA-NSG-13-E-3
3/64- 2/65

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GPE 1053 FIELD 7C, 7A, 7D,20M

NEW YORK UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK
ENERGY TRANSFER
H. P. KALLMANN, W. BRANDT
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AEC-BIOLOGY + MEDICINE

GPE 1056 FIELD 20J, 5A,20L, 7B

NEW YORK UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

ENERGY LOSS PROCESSES
H. P. KALLMAN, W. BRANDT
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AEC-BIOLOGY + MEDICINE

GPF 308 3 FIELD 5A,20L, 7B

IBM RESEARCH CENTER, NEW YORK

DEFECTS IN CRYSTALS

A. S. NOWICK, B. S. BERRY, R. FEDER

AF-30-1-2811
5/65- 5/66

AEC-DIVISION OF PHYSICAL RES

GQF 3840 FIELD 20J,20F,20I, 7B

LASER PUMPING TECHNIQUE STUDY

P. A. SILBERG

AF-49-638-01420
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DOD-AIR FORCE

GQF 4055 1 FIELD 8G

TEX. INSTR., INC., D, TEXAS

BASIC RESEARCH IN CRUSTAL STUDIES

M. BACKUS

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GQF 4059 2 FIELD 20L

RESEARCH ON X-RAY DIFFRACTIOMETRY OF COMPLEX POWDER PATTERNS

W. PARRISH

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GQF 4302 FIELD 20J, 7D,20I, 7B

PLASMA PROBING WITH HIGH ENERGY BEAMS

R. L. HICKOK

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/65- /

DOD-AIR FORCE

GQF 4424 FIELD 12A, 9D

AMER MATH SOC, RHODE ISLAND

A SYMPOSIUM IN APPLIED MATHEMATICS ON MAGNETO-FLUID AND PLASMA DYNAMICS

G. L. WALKER

AF-AFOSR-0835-65
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GQF 258540 2 FIELD 9+,20I

POLYTECH INST BROOKLYN, SCHOOL OF ENGINEERING, ELECTROPHYSICS, NEW YORK

THEORETICAL RESEARCH ON THE SPATIAL + TEMPORAL ASPECTS OF ELECTROMAGNETIC FIELDS

L. B. FELSEN

AF-19-628-02357
/65- /

DOD-AIR FORCE

GQF 259058 FIELD 20M, 9+, 9A,20F

STANFORD UNIVERSITY, GRADUATE SCHOOL, CALIFORNIA

THEORETICAL + EXPERIMENTAL STUDIES OF MICROWAVE ACOUSTICS PHONONS AND ATTENUATION IN VARIOUS CRYSTALS

H. J. SHAW

AF-19-628-04788
/65- /

DOD-AIR FORCE

GQF 259554 FIELD 20J,20D

DESIGN + FABRICATION OF VACUUM CHAMBER FOR MOLECULAR BEAM STUDIES UNDER LOW PRESSURE CONDITIONS

. NONE

AF-19-628-04760
/65- /

DOD-AIR FORCE

GQF 259946 FIELD 9+, 9A,12A, 9C

MATHEMATICAL STUDY OF DIFFUSED P-N JUNCTIONS + CORRELATION OF DIFFUSION EFFECTS WITH JUNCTION CHARACTERISTICS

D. KENNEDY

AF-19-628-05072
/65- /

DOD-AIR FORCE

GQF 260413 FIELD 20D,20I

UNIV OF TORONTO, GRADUATE SCHOOL, CANADA

INVESTIGATION OF POSSIBILITIES OF PRODUCING MEASURABLE AMOUNTS OF NEGATIVE IONS IN THE HIGH SPEED PLASMA FLOWS

J. H. DELCUW
AF-19-628-05134
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DOD-AIR FORCE

GQF 284603 1 FIELD 20J,20I,20D, 7B

GENERAL TELEPHONE + EL, ECTRONICS, BAYSIDE, LI, NEW YORK

OPTICAL PROPERTIES OF BINARY GAS PLASMAS

W. WATSON

AF-33-615-02318
/65- /

DOD-AIR FORCE

GQF 284730 2 FIELD 20J,20F,20L, 7B

WEIZMANN INST OF SCI, ISRAEL

ORDERED MAGNETISM IN SOLIDS

J. SHTRIKMAN

AF-61-052-00654
/65- /

DOD-AIR FORCE

GQF 284873 1 FIELD 9+, 9A,20L, 7B

SWITCHING IN FERRIELECTRIC CRYSTALS

W. R. COOK

AF-33-615-01227
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DOD-AIR FORCE

GQF 284903 FIELD 20J,20L

LITTON SYSTEMS INC, ST PAUL, MINNESOTA

LOW ENERGY DIFFRACTION STUDIES OF SPUTTERED SURFACES PART II

G. WEHNER

/65- /

DOD-AIR FORCE

GQF 284904 FIELD 9+,20I

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

PROPERTIES OF PLASMA BOUNDARIES

G. S. KINO
/65- /

DOD-AIR FORCE

GQF 284909 FIELD 20I,20L, 7B

SYS. RES. LAB. INC.,, OHIO

DIAGNOSTIC OF PLASMA PROPERTIES

R. A. OLSON
/65- /

DOD-AIR FORCE

GSE 287 3 FIELD 20D,10B

STANFORD UNIVERSITY, SCHOOL OF ENGINEERING, MECHANICAL ENGINEERING, CALIFORNIA

BOUNDARY LAYER BEHAVIOR ON TOTATING SURFACES

J. B. JOHNSTON

NSF-GK-671
11/65-11/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 789 FIELD 20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

YIELD CRITERION FOR REINFORCED CONCRETE SLABS

M. A. SOZEN, W. L. GAMBLE

NSF-GK-171
3/65- 3/66

NSF-ENGINEERING SCIENCES DIVISION

GSE 815 FIELD 20J

UNIV OF CAL-BERKELEY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, CALIFORNIA

MEASUREMENT OF LOW ABSORBENCIES BY GAS LASERS

J. R. WHINNERY

NSF-GK-457
6/65- 6/66

NSF-ENGINEERING SCIENCES DIVISION

GSM 322 2 FIELD 20H,20C

MICHIGAN STATE UNIV, GRADUATE SCHOOL, MATHEMATICS, MICHIGAN

INTRINSIC METHODS IN MAGNETO-FLUID DYNAMICS

R. H. WASSERMAN

NSF-GP-3832
12/65-12/66

NSF-MATHEMATICAL SCIENCES DIVISION

GSP 873 3 FIELD 20H,20J

NORTHWESTERN UNIV, GRADUATE SCHOOL, PHYSICS, ILLINOIS

FIELD THEORY AND HIGH ENERGY PHYSICS

L. M. BROWN, R. H. CAPPS

NSF-GP-3912
12/65-12/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2241 FIELD 20M

UNIVERSITY OF COLORADO, GRADUATE SCHOOL, CHEMISTRY, COLORADO

HEAT CAPACITIES OF CRITICAL MIXTURES

S. J. GILL
NSF-GP-4680
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2389 FIELD 5A,20A

UNIV OF VT + ST AGRIC, GRADUATE SCHOOL, PHYSICS, VERMONT

MICROBUBBLE DYNAMICS IN ULTRASONIC WAVES

T. D. SACHS
NSF-GP-4131
2/65- 2/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2390 FIELD 5A,20L

NEW YORK UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

ELECTRONIC CONDUCTIVITY IN ORGANIC SOLIDS

M. POPE, H. P. KALLMAN

NSF-GP-4206
3/65- 3/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2391 FIELD 20M, 5A,20L

SYRACUSE UNIVERSITY, GRADUATE SCHOOL, PHYSICS, NEW YORK

PARAMAGNETIC RESONANCE AT VERY LOW TEMPERATURES

A. HONIG, R. RUBINS

NSF-GP-4286
7/65- 7/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2396 FIELD 5A,20H

CATHOLIC UNIV OF AMER, GRADUATE SCHOOL, PHYSICS, DIST OF COLUMBIA

WEAK INTERACTION THEORY

H. UBERALL

NSF-GP-4340
6/65- 6/66

NSF-PHYSICAL SCIENCES DIVISION

GSP 2397 FIELD 5A,20L

UNIVERSITY OF ILLINOIS, GRADUATE SCHOOL, PHYSICS, ILLINOIS

INTERNATIONAL COLOR CENTER SYMPOSIUM

W. D. COMPTON

NSF-GP-3996
2/65- 2/66

NSF-PHYSICAL SCIENCES DIVISION

NIL 59 FIELD 12A,13M,20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, AERONAUT + ASTRONAUT, ILLINOIS

BUCKLING OF ELASTIC AND VISCOELASTIC COLUMNS WITH RANDOM IMPERFECTIONS AND LOADS

Y. K. LIN, H. H. HILTON, T. J. MCDANIEL
/65- /

ILLINOIS, UNIVERSITY OF

NIL 177 FIELD 12A, 5C,13M,20L

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

ELASTIC DESIGN OPTIMIZATION BY NONLINEAR PROGRAMMING /65- /

A. H. ANG, D. M. BROWN
ILLINOIS, UNIVERSITY OF

NIL 180 FIELD 20L,20K

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, CIVIL ENGINEERING, ILLINOIS

INELASTIC BEHAVIOR OF STRUCTURES UNDER DYNAMIC LOADINGS
/65- /

R. J. MOSBORG
ILLINOIS, UNIVERSITY OF

PRW 72 1 FIELD 20M,20J,20L, 7B

TEXAS A + M UNIVERSITY, GRADUATE SCHOOL, TEXAS

STUDIES ON CHEMICAL SYSTEMS
C. F. SQUIRE, T. ADAIR, H. MOELLER
D. MOYER, D. NAUGLE
A-113
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PRW 74 1 FIELD 12A,20J, 7B

TEXAS SOUTHERN UNIV, GRADUATE SCHOOL, TEXAS

QUANTUM MECHANICAL INVESTIGATIONS OF THE CHEMICAL AND PHYSICAL PROPERTIES OF CERTAIN ATOMIC AND MOLECULAR SYSTEMS
C. M. WOMACK
J-115
5/65- 4/66

WELCH, ROBERT A FOUNDATION-TEXAS

PS 34 FIELD 5A,20J

UNIVERSITY OF ILLINOIS, SCHOOL OF ENGINEERING, PHYSICS, ILLINOIS

RESEARCH IN THEORETICAL PHYSICS
L. P. KADANOFF /65- /
SLOAN, ALFRED P FDN

PW 961 FIELD 20D

PA MILITARY COLLEGE, PENNSYLVANIA

TIME-VARYING TEMPERATURE FIELDS IN AN EXPANDED GAS SYSTEM

L. A. MADONNA
9/64- 8/65

SOCIETY SIGMA XI + SC RES SOC AMER

ZBA 710 FIELD 20M,20F,20L, 7B

USDC, NATL BUR STAN, DIST OF COLUMBIA

ELECTRO-OPTICAL STUDIES

H. P. FREDERIKSE
11/64-10/65

COMMERCE-NATIONAL BUREAU OF STANDARDS

ZPE 998 FIELD 7D,20J, 5A, 18A

ENERGY TRANSFER AND SCINTILLATIONS IN GASES
/66- /

H. SCHULTZ
AEC-BIOLOGY + MEDICINE

ZPE 1000 FIELD 20J, 5A, 7B

INTERACTION OF ELECTRONS WITH GASES

J. C. BOWE
/66- /

AEC-BIOLOGY + MEDICINE

ZQF 260004 FIELD 4A, 8+, 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

ELF-VLF PROPAGATION STUDY

E. A. LEWIS
/65- /

DOD-AIR FORCE

ZQF 260024 FIELD 4A, 8+, 9+

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

IONOSPHERIC RADIO DISTURBANCES

H. S. MARSH
/65- /

DOD-AIR FORCE

ZQF 260158 FIELD 3A, 3B,20I,20J

USAF, OAR, AFCRL, HANSCOM, BEDFORD, MASSACHUSETTS

EXPLODING WIRES AND DEGENERATE PLASMA PROBLEMS

W. CHACE
/65- /

DOD-AIR FORCE

ZQF 284618 3 FIELD 9+, 9A,20L

USAF, OAR, AAL, WRIGHT-PATT-APPL MATH, OHIO
FERROELECTRICITY
S. E. CUMMINS
DOD-AIR FORCE

ZQF 284746 1 FIELD 20J,20F,20L, 7B

USAF, AFSC, RTD, WRIGHT-PATT-AF MAT LAB, OHIO /65- /
W. L. BAUN
BASIC SPECTROMETRIC ANALYSIS OF SOLIDS
DOD-AIR FORCE

ZQF 284783 4 FIELD 20M,20F

USAF, ARNOLD AFS, TENNESSEE

THERMAL RADIATIVE PROPERTIES OF CRYODEPOSITS
J. P. DAWSON
AF-40-600-01000
/65- /
DOD-AIR FORCE

21. Propulsion and Fuels

GQF 4097 1 FIELD 7D, 7C,21B,21I

PHILCO CORP, NEWPORT BEACH, AERONUTRONIC DIV, CALIFORNIA

THERMODYNAMIC PROPERTIES OF PROPELLANT COMBUSTION PRODUCTS

D. L. HILDENBRAND
AF-49-638-01577
/65- /

DOD-AIR FORCE

22. Space Technology

SH 346 3 FIELD 9C, 9+

DUKE UNIVERSITY, SCHOOL OF ENGINEERING, ELECTRICAL ENGINEERING, NORTH CAROLINA

RESEARCH ON SATELLITE ELECTRICAL POWER CONVERSION SYSTEMS AND CIRCUIT PROTECTION

T. G. WILSON
NASA-NSG-152-SP-4
2/64- 1/65

NASA

TECHNICAL ABSTRACT BULLETIN

Field 1-AERONAUTICS

1. AERONAUTICS

AD-630 696 Fld. 1
CLAPP (WILLIAM F) LABS INC DUXBURY MASS
A SURVEY AND ILLUSTRATED CATALOGUE OF THE TEREDINIDAE (MOLLUSCA: BIVALVIA),
by Ruth D. Turner. 1966, 269p. Contract Nonr-2318(00), Nonr-1866(45) Proj. NR-104-403, NR-104-687
Unclassified report

Copies for DDC users only. Others may be obtained from the Museum of Comparative Zoology, Harvard Univ., Cambridge, Mass. 02138.

Descriptors: (*Marine borers, Catalogs), (*Mollusca, Marine biology), Morphology (Biology), Physiology, Life cycle, Identification, Distribution, Fouling

The four major objectives in undertaking this study were: (1) To make available a catalogue of all the names used in the family Teredinidae; to illustrate as many of the type specimens as possible, giving descriptive notes concerning them; and to indicate synonyms whenever this could be done. (2) To survey the work that has been done on the systematics, biology and distribution. (3) To study the anatomy of as many species as possible and to relate the findings to the classification, evolution and physiology of the Teredinidae. (4) To redefine the genera and to make a key for use in the generic placement of species. (Author)

1/1. AERODYNAMICS

AD-630 924 Fld. 1/1, 20/4
CFSTI Prices: HC $9.60 MF $0.75
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y
WIND TUNNEL TEST OF 1/7 SCALE MODEL OV-1.
Final rept.,
by Fred W. Shepheard. Dec 65, 80p. Contract DA-44-177-AMC-271 (T) Task 1P125901A14203, USAAVLABS TR-65-73
Unclassified report

Descriptors: (*Vertical take-off planes, Aerodynamic characteristics), Model tests, Wind tunnel models, Drag, Lift, Pitch (Motion), Aircraft canopies, Nacelles, Fuselages, Airplane models

Wind tunnel tests were conducted on a 1/7 scale model of the OV-1 airplane to determine the power-off drag, lift, and pitching moment coefficients of the model and its various components. Significant drag differences were measured between production canopy and nacelle configurations and streamlined fuselage and nacelle configurations, but are not considered applicable. No other significant drag differences were measured. (Author)

AD-630 827 See Fld. 21/5

1/2. AERONAUTICS

AD-630 927 Fld. 1/2
CFSTI Prices: HC $10.60 MF $0.75
BELL HELICOPTER CO FORT WORTH TEX
HIGH-PERFORMANCE UH-1 COMPOUND HELICOPTER MANEUVER FLIGHT TEST PROGRAM.
Final rept.,
by James F. Van Wyckhouse. Feb 66, 101p. Rept. no. BHC-533-099-025, Contract DA-44-177-AMC-162 (T) Task 1P121401A14311, USAAVLABS TR-66-17
Unclassified report

Descriptors: (*Helicopters, Maneuverability), (*Helicopter rotors, Flight testing), Performance (Engineering), Rotor blades (Rotary wings), Lift, Thrust, Loading (Mechanics), Stability

The report presents the results of flight tests conducted with the USAAVLABS-Bell High Performance Compound Helicopter to extend its flight envelope. Particularly with respect to maneuvers. Rotors with standard UH-1B and tapered tip blades were evaluated. With the tapered tip blades, the compound helicopter was flown to a true airspeed of 221 knots and the rise in power required and rotor controls load associated with compressibility was delayed by about .05 Mach number. Approximately 55 maneuvers, encompassing a velocity-normal acceleration envelope exceeding 2g's at 190 knots, were accomplished. The distribution of lift between the wing and rotor is defined and it is shown that the rotor provides the largest increase of normal load factor during the maneuver. Normal maneuver and structural limited rotor thrust coefficients are defined as a function of advance ratio and rotor propulsive force. Although rotor system dynamics, blade twist, planform, airfoil, etc., will influence these values of limiting thrust coefficients, it is believed that with proper interpretation the limits shown are generally applicable to all rotorcraft. (Author)

AD-631 147 Fld. 1/2, 5/9
CFSTI Prices: HC $6.00 MF $1.50
NAVAL AIR TEST CENTER PATUXENT RIVER MD
PERFORMANCE TESTING MANUAL, U. S. NAVAL TEST PILOT SCHOOL,
by M. W. Townsend Jr., May 65, 255p.
Unclassified report

Descriptors: (*Flight testing, Instruction manuals), (*Aircraft, Flight testing), Pilots, Performance (Engineering), Performance tests, Data, Training, Aeronautics, Naval aircraft

Contents: Performance flight tests and data reduction, TPS airplane details, the flight report, aerodynamic data, and performance instrumentation.

AD-630 779 See Fld. 17/7

1/3. AIRCRAFT

AD-630 622 Fld. 1/3
CFSTI Prices: HC $2.00 MF $0.50
NEW YORK UNIV N Y DEPT OF AERONAUTICS AND ASTRONAUTICS
SHAPE AND STRESS ANALYSIS OF ROTATIONALLY SYMMETRIC BALLOONS.
Scientific rept.,
by Arnold D. Kerr, and Harold Alexander. Sep 65, 32p. Rept. no. NYU-AA-65-11, Contract AF 19 (628)-4990, Proj. AF-6665, Task 666501, AFCRL 66-116
Unclassified report

Descriptors: (*Balloons, Mathematical analysis), Configuration, Stresses, Pressure, Lift

This report considers the title problem from a general point of view. The governing differential equations are derived; and for specified stress conditions the shape equations which yield 'natural shape' balloons, 'equal strength' balloons, etc., are obtained. Throughout the report the resulting equations are correlated with the corresponding results derived and used by previous investigators. It is pointed out that the tabulated shapes which are used in prescribing the initial shapes of tailored balloons are actually those of deformed balloons. Therefore, when the shape of the balloon floating at altitude differs noticeably from its initial design form because of the deformations of the skin, the desired stress condition will not be realized. (Author)

AD-630 860 Fld. 1/3
CFSTI Prices: HC $1.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
CALCULATION OF THIN-WALLED AIRCRAFT FUSELAGE-TYPE SECTIONS WITH OPENING,
by A. F. Kuchinskii. Mar 66, 20p. Rept. no. FSTC-HT-23-66-66, TT 66-60964
Unclassified report

Trans. of Aviatsionnyi Institut, Kazan. Trudy (USSR) v77 p35-48 1963.

Descriptors: (*Fuselages, Stresses), Aircraft, Elasticity, Boundary value problems, Model theory, USSR

In the article, a method for calculating the concentration and redistribution of stresses in the area of a rectangular opening in a close-ribbed, cylindrical, thin-walled structure like an aircraft fuselage is presented. It is found that the elasticity of the fuselage sectors on either side of the sector with the opening, as well as the length of the opening, have essential influence on the concentration of stress around the opening. (Author)

AD-630 925 Fld. 1/3, 13/9
CFSTI Prices: HC $3.00 MF $0.75
BOEING CO MORTON PA VERTOL DIV
AN EXPERIMENTAL EVALUATION OF THE CONFORMAL GEAR.
Final rept.,
by J. C. Mack, J. P. Alberti, and A. J. Lemanski. Feb 66, 80p. Rept. no. R-429A, Contract DA-44-177-AMC-101 (T), Proj. DA-1M121401D14404, USAAVLABS TR-66-8
Unclassified report

See also AD-605 844.

Descriptors: (*Transmission gears, Helicopters), (*Reduction gears, Helicopters), (*Helicopters, Gears), Power, Transmissions, Design, Tests, Loading (Mechanics), Strain (Mechanics)

The conformal gear was studied as a means of improving helicopter final reduction drives. By eliminating certain inherent limitations of the involute gear, the developed conformal tooth form has the potential of bettering current power-to-weight ratios. An analytical and experimental effort was conducted on carburized and ground conformal gears.

AD-631 186 Fld. 1/3, 15/5
CFSTI Prices: HC $12.60 MF $1.00
LOCKHEED-GEORGIA CO MARIETTA
C-5 PROGRAM - CARGO AND TRANSPORT SUBSYSTEM REPORT.
Rept. for 15 Feb 65-31 Mar 66,
by Robert A. Baker, and James H. Monti. 31 Mar 66, 74p. Rept. no. LG1S30-1-1, Contract AF 33 (657)-15053,
Unclassified report

Descriptors: (*Transport planes, Configuration), Pallets, Tracked vehicles, Cargo vehicles, Cargo

The report provides a complete description of the logistic cargo handling provisions of the C-5 airplane including palletized cargo and wheeled and tracked vehicles. The report also describes the aerial delivery provisions and capabilities of the airplane including the airdrop of both cargo and paratroops. Personnel carrying capabilities of the C-5 airplane are also described. (Author)

AD-630 988 See Fld. 19/1

1/4. AIRCRAFT FLIGHT INSTRUMENTATION

AD-630 664 Fld. 1/4, 13/8
CFSTI Prices: HC $5.60 MF $0.75
BATTELLE MEMORIAL INST COLUMBUS OHIO
INVESTIGATION OF THE OCCURRENCE OF CONDENSATION IN FLIGHT INSTRUMENTS.
Final technical rept., Sep 63-Db* 65,
by Benson G. Brand, Bailey Bennett, and R. I. Leininger. Jan 66, 59p. Contract AF 33 (657)-12462,
SEG TR-66-2

Unclassified report

Descriptors: (*Flight instruments, *Moisture-proofing), (*Condensation, Flight instruments), Fog, Moisture, Visibility, Instrument dials, Glass seals, Desiccants

This study is related to the location and identification of sources of fog formation on the faceplates of hermetically sealed aeronautical instruments. Two types of fog (moisture and permanent) were found. Moisture fog was shown to be caused by imperfect hermetic sealing of the instrument cases. Permanent (oily) fog was found to be the result of partial decomposition of nonmetallic materials by heat. This decomposition in certain materials results in oily products with appreciable vapor pressure, which may condense on the instrument faceplate, usually the coolest part of the instrument. Thirteen aeronautical instruments representing seven different types, and made by five different suppliers, were covered by this study. Included in the report are: (1) A list of recommended materials; (2) a list of materials shown to contribute to permanent-fog formation; (3) a discussion of the psychrometry of gases; (4) a discussion of desiccants; (5) a critique of the ice-cube test; (6) a recommended modification of the ice-cube test to duplicate more nearly the use conditions; (7) a description of a high-sensitivity fog-potential test; (8) instructions for the use of the test in Item (7); and (9) pertinent excerpts from the International Critical Tables. (Author)

AD-631 141 Fld. 1/4, 9/3
CFSTI Prices: HC $1.60 MF $0.50
NAVAL AVIONICS FACILITY INDIANAPOLIS IND
PRODUCTION TEST EQUIPMENT FOR ALTIMETER WARNING TEST SET AN/APM-254.
Final rept.,
by Rolland McMaster. 21 Mar 66, 14p. Rept. no. NAFI-TR-793,

Unclassified report

Descriptors: (*Altimeters, Warning systems), (*Warning systems, Test equipment (Electronics), (*Test sets, Altimeters), Automatic, Tapes, Magnetic tape, Control systems

The AN/APM-254 is designed to test the Radar Altimeter Warning Set AN/APQ-107 at the flight line or shop level. It consists of a suitcase type housing containing a syncro, altimeter and bellows system, aural system, switches and panel lamps. The test set calibrates and functionally tests the RAWS unit utilizing visual and aural indications. Supertester is a tape-operated test system capable of measuring: ac and dc voltages, impedance, resistance, as well as continuity and leakage. The system contains bridge circuits for measurements, utilizing a floating (isolated from ground) 600-input two-wire system. Out-of-tolerance readings are indicated by means of an indicating lamp, buzzer, and printed test number. Manual and automatic control of the system is provided by a tape reader and control panel. Conclusions: Use of self-contained semi-automatic test systems (such as Supertester) on the Altimeter Warning Test Set program resulted in a substantial savings. The equipment lent itself to rapid incorporation of changes imposed by modifications to the field test set. (Author)

1/5. AIR FACILITIES

AD-630 561 Fld. 1/5, 8/13
CFSTI Prices:MF $0.50
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
SUBGRADE STABILIZATION WITH PORTLAND CEMENT AND HYDRATED LIME UNDER MODIFIED T11 LANDING MAT.
Final rept.,
by William N. Brabston, and Richard A. Pimental. Mar 66, 47p. Rept. no. Miscellaneous Paper-3-798,
Proj. 1-V-0-21701-A-046,

Unclassified report

Availability: U. S. Army Engineer Waterways Exp. Sta., Vicksburg, Miss. HC$0.75.

Descriptors: (*Soil mechanics, *Landing mats), Cements, Calcium compounds, Hydroxides, Soils, Stabilization, Clay, Silt, Foundations (Structures)

Sections of a low-strength subgrade (4 to 7 CBR) were treated with portland cement and hydrated lime to assist in maintaining the strength of the sensitive clayey-silt soil during inclement weather and to develop information on the relative merits of selected methods for stabilizing the subgrade. It was determined that both portland cement and hydrated lime, applied as 3 percent admixtures, were effective in improving the resistance of the sensitive subgrade soil to loss in bearing capacity during wetweather operations, the benefits resulting primarily from modification of the soil plasticity rather than any significant strength increase mechanism. The technique of applying hydrated lime by alternating layers of lime with layers of soil did not result in any determinable benefit, although some diffusion of lime was indicated. The use of polyethylene sheeting as a membrane under landing mat was of doubtful value because of its inability to withstand mat embedment without damage. Recommendations are made to consider the use of admixed cement or lime, the choice depending on the particular soil and problem, in future landing mat test operations were bearing capacity of the subgrade needs to be preserved.

AD-630 599 Fld. 1/5
CFSTI Prices:MF $0.50
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
ENGINEERING TESTS OF EXPERIMENTAL T11 ALUMINUM AIRPLANE LANDING MAT. APPENDIX B: DEVELOPMENT OF REVISED DESIGN CRITERIA FOR T11 LANDING MAT.
Technical rept.,
by D. N. Brown. Feb 66, 26p. Rept. no. TR-3-634,
Proj. DA-1-V-0-21701-A-046, Task 1-V-0-21701-A-046-05,

Unclassified report

Availability: Available from U. S. Army Engineer Waterways Experiment Station, Corps. of Engineers, Vicksburg, Miss., $0.50.

Descriptors: (*Landing mats, Aluminum), Design, Performance (Engineering), Tests, Thickness, Graphics

Experience with landing mat has led to increased confidence through accumulated knowledge of its performance. This in turn indicated a need to relax the early-adopted policy of very conservatively rating the subgrade strength of test sections used in determining mat performance. This report documents the revised policy and presents revised T11 landing mat design criteria developed from recent data and those in the basic report. The specific design curves presented herein for airfields surface with T11 mat (plates 1-7) should be considered in lieu of those in the basic report which were prepared on the more conservative philosophy of test analysis. (Author)

AD-630 639 Fld. 1/5, 5/5
CFSTI Prices: HC $3.00 MF $0.50
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
DEVELOPMENT OF DESIGN STANDARDS FOR GROUND SUPPORT CONSOLES.
Final technical rept.,
by K. W. Kennedy, and C. Bates,Jr.. Dec 65, 55p. Rept. no. AMRL-TR-65-163,
Proj. AF-7184, Task 718404 ,718408

Unclassified report

Descriptors: (*Ground support equipment, Display systems), (*Display systems, Ground support equipment), Human engineering, Design, Air force personnel, Weapon systems, Air force equipment

Experience gained in using a single standardized ground-support console configuration in the WS 131-B, Hound Dog, is discussed. Other ground console designs for possible standardization in future systems are described in detail. All designs are derived from a basic sit-stand configuration and will accommodate approximately 95% of the USAF male population and approximately 60% of the USAF female population. Each of the consoles can be made from five standard subassemblies. The suggested standard configurations permit engineering design freedom, yet restrict certain dimensional characteristics of the consoles to assure accommodation to the requirements and capabilities of the operator. (Author)

Field 2-AGRICULTURE

2/1. AGRICULTURAL CHEMISTRY

AD-630 854 Fld. 2/1
CFSTI Prices: HC $1.10 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
EMULSIFYING PROPERTIES OF BLOOD ALBUMIN AND ITS APPLICATION IN FOOD EMULSION PRODUCTION,
by N. I. Kozin, and I. A. Snegireva. Mar 66, 9p. Rept. no. FSTC-HT-23-43-66,
TT 66-60959

Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Pishchevaya Tekhnologiya (USSR) n4 (47) p76-8 1965.

Descriptors: (*Serum albumin, Colloids), (*Food, Animals), (*Colloids, Food), Milk, Preparation, Storage, USSR

Blood albumins were found to be satisfactory emulsifying agents in the manufacture of a stable emulsion of sunflower-seed oil and water, containing sugar, salt, and vitamin A, to be used as feed for young farm animals. (Author)

Field 3-ASTRONOMY AND ASTROPHYSICS

3/1. ASTRONOMY

AD-630 614 Fld. 3/1
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
CRATER FREQUENCY EVIDENCE FOR VOLCANISM IN THE LUNAR HIGHLANDS.
Environmental research papers,
by Robert T. Dodd,Jr., Vern G. Smalley, John W.

Salisbury, and Joel E. M. Adler. Feb 66, 12p. Rept. no. AFCRL-ERP-170, AFCRL-66-83 Proj. AF-8602, Task 860203,

Unclassified report

Availability: Published in Annals of the New York Academy of Sciences v123 Art2 p555-62 Jul 15 1965. Copies to DDC users only.

Descriptors: (*Moon, Terrain), Astrophysics, Extraterrestrial topography, Volcanoes, Orogeny, Dust

A crater frequency analysis was made of the Cratered Plain Province. The possible deposition of a thick blanket of material in this area is interpreted to be evidence for volcanism. (Author)

AD-630 642 Fld. 3/1
CFSTI Prices: HC $4.00 MF $1.00
LOCKHEED-CALIFORNIA CO BURBANK
ASTRODYNAMIC CONSTANTS ANALYSIS.
Final rept., 12 Sep 63-11 May 65,
by Samuel Herrick. 31 Jan 66, 135p. Rept. no. LR-19480,
Contract AF 19 (628)-3820, Proj. AF-8654, Task 865404,
AFCRL 66-129

Unclassified report

Descriptors: (*Astronomy, Measurement), Mathematical analysis, Statistical analysis, Dynamics, Physical properties, Geodesy, Gravity, Astronomical data, Bodies of revolution

In the field of astrodynamics the numerical values of various physical constants are required with the greatest precision possible. The report explains that generally the most desirable units for astrodynamical work are different from those used in the laboratory and rely heavily on astronomical observations. Furthermore, there is much interdependency among them complicated by accidental and unknown systematic errors. By employing statistical methods the accidental errors are reduced and the use of metastatistics reduces the effects of the unknown systematic errors. These techniques are applied to presently available data to establish the best values of various gravitational, geodetic and related constants. The report also recognizes the fact that none of the constants are definitive, but subject to further improvement in the future. (Author)

AD-631 045 Fld. 3/1, 20/6
CFSTI Prices: HC $4.60 MF $0.50
HULL UNIV (ENGLAND) DEPT OF APPLIED PHYSICS
SOLAR SYSTEM SPECTROPHOTOMETRY. DESIGN CONSIDERATIONS FOR A MULTIPLEX DISPERSIVE INFRARED SPECTROMETER.
Annual summary rept. 1 Nov 63-31 Dec 64,
by J. F. Grainger. 31 Dec 64, 45p. Contract AF 61 (052)-751,

Unclassified report

Descriptors: (*Solar system, Spectroscopy), (*Venus, *Infrared spectroscopy), (*Spectrum analyzers, Multiplex), Design, Telescopes, Balloons, Interferometers, Infrared optical equipment, Great Britain

The problems of observing the near infrared spectrum of Venus, using a twelve inch balloon-borne telescope, are assessed. Considerations of the integrated signals available in the desired resolved width of approx. 0.1 microns in the wavelength region visible to 3 microns, show the need for multiplexing. Spectrometric systems of this type are discussed and a dispersive spectrometer using a multi-channel coded disc in the emergent focal plane is shown to possess certain advantages over the others in this type of problem. (Author)

AD-631 097 Fld. 3/1
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
STRUCTURE OF THE CRATER ALPHONSUS.
by Luciano B. Ronca. 1966, 2p.

Unclassified report

Availability: Published in Nature v209 n5019 p182 8 Jan 1966. Copies to DDC users only.

Descriptors: (*Moon, *Photogeology), (*Lunar probes, Photogeology), Astronomy, Extraterrestrial topography, Structural geology

The photographs of the Crater Alphonsus obtained by Ranger IX show several features which may have structural significance from the point of view of the history of the lunar crust.

3/2. ASTROPHYSICS

AD-630 558 Fld. 3/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
THE MEASUREMENT OF THE FLUXES OF DISCRETE SOURCES OF COSMIC RADIO EMISSION AT FREQUENCIES BELOW 40 MHZ.
Research translation,
by L. Bazelian, S. Ia. Braude, Iu. M. Bruk, I. M. Zhukand , and A. V. Men. Jan 66, 12p. Rept. no. T-U-4,
Contract AF 19 (628)-3880,
TT 66-60839

Unclassified report

Vymiriuvannia Potokiv Dyskretnykh Dzherel Kosmichnogo Radiovyprominiuvannia na Chastotakh Nyzhche 40 Mgts, trans. of Akademiya Nauk URSR, Kiev. Dopovidi, n2 p188-92 1963.

Descriptors: (*Radio astronomy, USSR), (*Stars, Radio astronomy), Galaxies, Very high frequency, Extraterrestrial radio waves, Radio telescopes

The purpose of the project was to measure the absolute flux densities of the emission of four discrete sources in frequency bands between 12 and 40 mHz: Cassiopeia A, Cygnus A, Taurus A, and Virgo A. In these experiments, which were performed in June to November 1961 and March to June 1962, two radio telescopes were used that had been developed at the radio astronomy laboratory of the Institute of Radio Physics and Electronics, Academy of Sciences of the Ukrainian SSR. One of these instruments operated in the 12-20 mHz band, and the other, in the 20-40-mHz band. (Author)

AD-630 613 Fld. 3/2
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
AN IMPROVED FEEDBACK RADIOMETER.
Instrumentation papers,
by William B. Goggins Jr.. Feb 66, 34p. Rept. no. AFCRL-IP-94, AFCRL-66-122
Proj. AF-4600, Task 460010,

Unclassified report

Descriptors: (*Radiometers, Feedback), Control systems, Gain, Attenuators, Performance (Engineering), Radio astronomy, Stability, L band, Noise (Radio), Demodulators, Servomotors, Microwave equipment

Feedback applied to a radiometer will stabilize its gain. Two improved versions of an earlier feedback radiometer system have been built and tested. One used a mechanical attenuator, and the other an electronic attenuator. The following improvements were incorporated: faster responding and more accurate servo-driven noise source, a current-source driver for the ferrite switch, more versatile rf circuitry, improved coherent detector, and transistorized circuitry. The response of both servo loops proved to be fast enough and linear enough for almost any radiometer application. (Author)

AD-630 628 Fld. 3/2
CFSTI Prices: HC $2.00 MF $0.50
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
MEASUREMENT OF LONG-WAVELENGTH COSMIC NOISE BY ZERO-CROSSING INTERFEROMETRIC APERTURE SYNTHESIS.
Final rept., 1 Oct 62-30 Sep 65,
by James William Graham, and Roy K. Breon. 30 Dec 65, 31p. Contract Nonr-3963 (02), Proj. NR-374-701,

Unclassified report

Descriptors: (*Extraterrestrial radio waves, Measurement), Scientific satellites, Digital systems, Data, Circular orbit trajectories, Synthesis, Data processing systems, Antenna apertures, Interferometers

A unique measurement system offering the possibility of mapping cosmic radiation at 100-1000 meter wavelengths with angular resolution of approximately 1 degree is described. The system requires an orbiting satellite pair to get above the ionosphere. An aperture synthesis method with a variable radio base line involving a technique of zero-crossing spatial crosscorrelation of clipped signals is described. The system offers a method of digital signal processing to achieve high angular resolution and dynamic range at low frequencies without erecting large arrays in space. The use of zero crossings in the digital signal processing permits a significant reduction in the data that must be processed in the satellite without sacrificing accuracy. The techniques described become easier to instrument the lower the measurement frequency of interest. The complexity of the system is independent of the maximum radio base line required. The techniques may be instrumented at frequencies as low as the interplanetary cutoff frequency at about 50 kc/sec. (Author)

AD-630 658 Fld. 3/2
CFSTI Prices: HC $2.60 MF $0.50
GEO-SCIENCE INC ALAMOGORDO N MEX
SOLAR RESEARCH AND DEVELOPMENT AT SACRAMENTO PEAK OBSERVATORY.
Rept. for 1 Jan 64-31 Dec 65,
by Mark W. Jones. Jan 66, 23p. Rept. no. Scientific-1,
Contract AF 19 (628)-3853, Proj. AF-7649, Task 764906,
AFCRL 66-92

Unclassified report

Descriptors: (*Solar flares, Scientific research), Solar disturbances, Astrophysics, Solar eclipses, Astronomical observatories, Instrumentation

The fundamental research work included studies of events preceding solar flares such as filament and plage activity, solar surges, and H alpha activity with the goal of increasing the reliability of predicting solar flares. The electronics research group contributed to the highly specialized instrumentation development at the observatory. These contributions included the design and development of units to aid in the data reduction, control systems for the various spectrograph and coronagraph systems, control systems for the flare patrol program, and the development of a Videx system for transmission of solar flare pictures to AFCRL Headquarters and Ent AFB. The staff also participated in the solar eclipse expedition and designed and tested the control systems for two eclipse spectrographs. (Author)

AD-630 806 Fld. 3/2
CFSTI Prices: HC $1.60 MF $0.50
TEXAS TECHNOLOGICAL COLL LUBBOCK DEPT OF CHEMISTRY
SPECTRAL STUDIES OF MATERIALS POSSIBLY PRESENT ON THE MARTIAN SURFACE.
Final rept. no. 1, 1 Feb 65-31 Jan 66,
by Arthur L. Draper, and Joe A. Adamcik. 1 Apr 66, 11p. Contract Nonr (G)-00035-65, Proj. NR-046-814 ,RR-004-06-01

Unclassified report

Descriptors: (*Mars (Planet), Surface properties), Simulation, Soils, Extraterrestrial terrestrial topography, Iron compounds, Oxides, Optical properties

Comparisons of the reflectance spectra of synthetic mixtures have been made with the observed spectrum of Mars in an effort to develop a mixture congruous with the Martian soil. Mixtures containing various amounts of the iron oxides geothite and hematite as the coloring material show the features of the Martian spectrum, particularly when the gethite and hematite are precipitated on finely ground quartz and kaolin. However, such mixtures are much more reflective than the planet. To date, two promising mixtures have been made, one prepared by the addition of the dark material magnetite, blende. The spectra of these two mixtures closely match the spectrum of Mars in the visible region and bracket it in the infrared. (Author)

AD-630 964 Fld. 3/2, 3/3
SMITHSONIAN ASTROPHYSICAL OBSERVATORY CAMBRIDGE MASS
REDISCUSSION OF MAXWELL'S ADAMS PRIZE ESSAY ON THE STABILITY OF SATURN'S RINGS. II,
by A. F. Cook, and F. A. Franklin. 19 Jul 65, 10p.

Unclassified report

Availability: Published in Astronomical Journal v71 n1 p10-9 Feb-1336 1966. Copies to DDC users only.

Descriptors: (*Saturn (Planet), Rings), Astrophysics, Planetary atmospheres, Stability, Mathematical models, Celestial mechanics

A study was made of the stability of Saturn's rings by investigating the properties of a model stabilized by gravitational dilution and random particle motions. Comparison of results with those of an earlier paper (Cook and Franklin 1964) indicates that of the two stabilizing mechanisms the latter is the more significant. An examination of all models which we have presented shows that the rings are gravitationally stable against infinitesimal disturbances if the average density is less that equivalent 0.18 g/cc, but unstable if it is greater than equivalent 1.04 g/cc. (Author)

AD-631 096 Fld. 3/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
THE H-ALPHA DOUBLE LIMB: A SCATTERED-LIGHT PHENOMENON.
Environmental research papers,
by G. W. Simon, and O. R. White. 24 Jun 65, 17p. Rept. no. AFCRL-66-185,AFCRL-ERP-179
Proj. AF-7649, Task 764906,

Unclassified report

Availability: Published in The Astrophysical Journal v143 n1 p38-47 Jan 1966. Copies to DDC users only.

Descriptors: (*Solar atmosphere, Spectroscopy), (*Sun, Spectroscopy), (*Hydrogen, Solar atmosphere), Astrophysics, Line spectrums

Two independent methods are used to demonstrate that the inner limb observed in H-alpha spectroheliograms by Cragg, Howard, and Zirin is an instrumental, not a solar, phenomenon. First, we show that low-scattered-light spectrograms do not display a double limb. Second, by photometric analysis of the Mount Wilson observations, we find that there is more than sufficient imaged scattered light in the Mount Wilson spectroheliograph to produce the observed inner limb by the scattering of light from the continuum into the H-alpha core. It is also shown that the concept of an inner limb is inconsistent with both theoretical models and other observations of the solar chromosphere. A real H-alpha double limb, not previously described, is seen at about plus or minus 1.0 A in the line wing. (Author)

AD-631 162 Fld. 3/2, 20/13, 20/4
MANCHESTER UNIV (ENGLAND) DEPT OF MECHANICS OF FLUIDS
THE EQUILIBRIUM STATE OF A SHOCK-HEATED ATMOSPHERE,
by G. A. Bird. 14 Oct 64, 9p. Contract AF-AFOSR-64-65,
AFOSR 66-0101

Unclassified report

Availability: Published in The Astrophysical Journal v141 n4 p1455-62 May 15 1965. Copies to DDC users only.

Descriptors: (*Solar atmosphere, Heating), (*Shock waves, Solar atmosphere), Solar wind, Solar corona, Convection (Heat transfer), Atmospheric temperature, Thermodynamics

Equations are developed to describe an atmosphere heated by an arbitrary distribution of shock waves. Solutions are obtained for an atmosphere with a steady outward mass motion ('solar wind') in which the heat supplied by the shock waves is balanced by the convective heat loss due to this motion. The boundary conditions for the solution are those appropriate to the outer solar atmosphere. It is found that there is a strong 'self-regulating' property of shock-heated atmospheres, in that very large changes in the initial heat input are compensated by the subsequent changes in shock strength. This means that, for a very large range of shock strengths and frequencies, the temperature profile is similar to that predicted by the 'constant shock strength hypothesis.' The maximum coronal temperature varies by only a few per cent from 1600000K while the initial heat input varies by a factor of thousands. However, the outward mass flux increases continuously with the initial heat input and, for very large initial inputs, the maximum temperature also rises appreciably. (Author)

AD-630 717 See Fld. 7/4

AD-630 805 See Fld. 4/1

AD-630 928 See Fld. 4/1

AD-630 976 See Fld. 22/2

AD-631 062 See Fld. 8/14

3/3. CELESTIAL MECHANICS

AD-631 165 Fld. 3/3
LINCOLN LAB MASS INST OF TECH LEXINGTON
SOLAR ROTATION AND PLANETARY ORBITS,
by Irwin I. Shapiro. 26 Aug 65, 3p. Rept. no. JA-2663,
Contract AF 19 (628)-5167,
ESD TDR-66-28

Unclassified report

Availability: Published in Icarus: International Journal of the Solar System v4 n5/6 p549-50 Dec 1965. Copies to DDC users only.

Descriptors: (*Celestial mechanics, Quadrupole moments), Sun, Rotation, Planets, Trajectories

The effects on planetary orbits of a solar quadrupole moment are analyzed including the consequences of the noncoplanarity of the solar equator and the ecliptic. (Author)

AD-630 964 See Fld. 3/2

AD-631 120 See Fld. 8/14

Field 4-ATMOSPHERIC SCIENCES

4/1. ATMOSPHERIC PHYSICS

AD-630 591 Fld. 4/1
CFSTI Prices: HC $2.00 MF $0.50
UTAH UNIV SALT LAKE CITY UPPER AIR RESEARCH LABS
ANTENNA IMPEDANCE PROBES IN HIGHLY DISTURBED IONOSPHERES.
Final rept. 1 Jun-30 Sep 65,
by Karl G. Seljaas. Sep 65, 47p. Rept. no. UU-66-2,
Contract AF 19 (628)-5192, Proj. AF-5710, AFCRL 65-737

Unclassified report

Descriptors: (*Probes (Electromagnetic), Atmospheric sounding), (*Electron density, *Ionosphere), Measurement, Electrical impedance, Dipole antennas, Rocket antennas, Instrumentation

This report details instrumentation developed for measurement of electron densities in a highly disturbed ionosphere. The measurement determines by a standing wave technique, the RF impedance of thin cylindrical antennas immersed in the plasma of the ionosphere. The electron density can be deduced from the antenna impedance variations. A previously developed Standing Wave Impedance Probe was used at frequencies of 3 and 12 MHz in conjunction with a newly developed 300-MHz system. Instrumentation details including schematic diagrams of both systems are presented. The dual impedance probe system was included in the payload of an Honest John-Nike-Javelin III fired from Eglin AFB in a DASA Project 6.4 certification round. (Author)

AD-630 805 Fld. 4/1, 3/2
CFSTI Prices: HC $.60 MF $0.75
COMISION NACIONAL DE INVESTIGACIONES ESPACIALES BUENOS AIRES (ARGENTINA)
INTERNATIONAL YEARS OF THE QUIET SUN. VOLUME 2. (ANOS INTERNACIONALES DEL SOL CALMO).
Special pub.
1965, 67p. Rept. no. CNIE-PE-7,
Contract AF-AFOSR-716-65,
AFOSR 66-0631

Unclassified report

Proceedings of the Regional Symposium held at Buenos Aires, Aug 64. See also AD-625 036.

Descriptors: (*Astrophysics, Symposia), (*Geophysics, Symposia), (*Space environmental conditions, Symposia), Extraterrestrial radio waves, Radio signals, Scintillation, Protons, Cosmic rays, Nuclear scattering, Electron density, Magneto-optic effect, Solar disturbances, Ionospheric disturbances

Contents: Observations of the atmospheric scintillation of radio star and satellite signals. Applications of the optical model for 2 Bev/C K (-) interactions. Directional and energy dependence of cosmic ray variations. Cosmic ray fluxes and rigidity calculations. Differential faraday measurement of electron content with the S-66 satellite. Cosmic ray storms and the daily variation.

AD-630 928 Fld. 4/1, 3/2, 8/14
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
DOUBLE SUNSPOT-CYCLE VARIATION IN TERRESTRIAL MAGNETIC ACTIVITY, 1884-1963.
Environmental research papers (revised ed.),
by Edwin J. Chernosky. 22 Oct 65, 14p. Rept. no. AFCRL-ERP-177,AFCRL-66-174
Proj. AF-8601, Task 860102,

Unclassified report

Revision of manuscript received 13 Aug 65.

Availability: Published in Journal of Geophysical Research v71 n3 p965-74 Feb 1 1966. Copies to DDC users only.

Descriptors: (*Sunspots, *Magnetic storms), (*Terrestrial magnetism, Sunspots), Solar disturbances, Ionospheric disturbances, Correlation techniques, Geophysics

The 11-year sunspot-number (or -latitude) cycle is known to be accompanied by a similar period variation in terrestrial magnetic activity. In this study, a double sunspot-number cycle variation, the basic sunspot-magnetism cycle of about 22 years, is found to occur in geomagnetic activity also. This variation is evidenced in two ways. Biannual maximums (near the equinoxes) in terrestrial magnetic activity are more pronounced at and just after the years of sunspot-number cycle minimums of 1887, 1912, 1933, and 1954 than at the alternate sunspot cycle minimums. In the Zurich even-numbered cycles, the last half of the sunspot-number cycle is more active than the first half, and the converse is true for the odd-numbered cycles. The superposition of a sunspot-magnetism cycle variation in geomagnetic activity of about one-fourth of that associated with the sunspot-number cycle would account for the trends noted. There is also some indication that the autumnal equinoctial maximum tends to peak in September during the even-numbered cycles and in October during the odd-numbered cycles. The daily magnetic character figure C for the 29,219 days from 1884 through 1963 is used as the index of terrestrial magnetic activity. The difference found in the solar effect upon the earth for alternate cycle minimums would indicate that results obtained during this IQSY could not be accurately extrapolated to the next sunspot-number cycle minimum, a factor to be considered in the space survey program. (Author)

AD-631 011 Fld. 4/1, 20/14
IOWA STATE UNIV IOWA CITY
AURORAL ZONE ELECTRON FLUX AND ITS RELATION TO BROADBEAM RADIOWAVE ABSORPTION,
by R. Parthasarathy, F. T. Berkey, and D. Venkatesan. 6 Sep 65, 19p. Contract N9enr-938 (03),

Unclassified report

Prepared in cooperation with Alaska Univ., Coll. Geophysical Inst. Grant NSF-GP-2779.

Availability: Published in Planet Space Sci. v14 p65-83 1966. Copies to DDC users only.

Descriptors: (*Radio waves, Absorption), (*Electron density, *Ionosphere), Aurorae, Alaska, Atmospheric sounding, Scientific satellites, Geophysics, High frequency, Radio transmission

The satellite Injun III passes over the auroral zone stations of College (L = 5.5) and Fort Yukon (L = 6.3), Alaska, during January 1963-October 1963, are utilized for a comparison of fluxes of precipitating and 'trapped' electrons with the instantaneous values of broad beam radio absorption at 27.6 Mc/s. The flux of precipitating electrons of energy E > 40 keV revealed clear control on the absorption magnitude. For a given precipitating flux of electrons of energy E > 40 keV, with pitch angles 0-43 degrees over the zone, the magnitude of absorption increased with the increasing availability of the flux with pitch angles >43 degrees. The trapped flux over the zone was, typically, ten to a hundred fold stronger than the precipitating flux, with only the instances of severe precipitation tending to be isotropic. The 'trapped' flux as such (E > 40 keV) was poorly related to the magnitude of absorption; while the trapped flux, E > 250 keV, E > 1.5 MeV were found unrelated to the magnitude of absorption. (Author)

AD-631 025 Fld. 4/1, 18/3, 20/9
CFSTI Prices: HC $1.60 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
PHYSICAL PICTURE OF THE FORMATION OF AN ARTIFICIAL RADIATION BELT BY THE AMERICAN HIGH-ALTITUDE THERMONUCLEAR BURST OF 9 JULY 1962,
by Yu. I. Galperin. 11 Mar 66, 12p. Rept. no. TG-230-T466,
Contract NOw-62-0604-c,
TT 66-61005

Unclassified report

Trans. of Issledovaniya Kosmicheskogo Prostranstva (USSR) 1965 p388-393.

Descriptors: (*Gamma rays, Upper atmosphere), (*Nuclear explosions, High altitude), Photographic analysis, Artificial radioactivity, Plasma physics, Thermonuclear reactions, USSR

Direct observations by Kosmos-5 and other satellite sources indicate that the final radius of the plasma cloud accompanying the American high-altitude burst of 9 July 1962 did not exceed 600 km. This is less than the final radius for a plasma cloud expanding in a vacuum, which indicates considerable dissipation of energy. Particle ejection beyond the plasma cloud is assumed to be the reason for this discrepancy and three mechanisms are proposed to explain the ejection: (1) diamagnetic ejection of plasma blobs due to instability at the interface between plasma and field; (2) free separation in the magnetosphere of fission fragments neutralized in the beginning stages of cloud expansion, i.e., before the stage of 'inertial separation'; (3) free separation in the magnetosphere of fragments neutralized by charge exchange between ions in the plasma cloud and neutral particles in the atmosphere. (Author)

AD-631 048 Fld. 4/1, 20/6, 17/2
CFSTI Prices: HC $5.60 MF $0.50
GENERAL ELECTRIC CO SCHENECTADY N Y RESEARCH AND DEVELOPMENT CENTER
APPLICATION OF ELECTRO-OPTICS TO AURORAL STUDIES. PHASE II.
Final rept., phase 2, Nov 63-Nov 65,
by J. E. Anderson. Dec 65, 56p. Contract AF 19 (628)-2366, Proj. AF-7661,
AFCRL 66-75

Unclassified report

See also AD-432 157.

Descriptors: (*Electrooptics, Aurorae), (*Aurorae, Spectroscopy), Night sky, Sky brightness, Measurement, Image orthicons, Television display systems, Stars, Celestial mechanics, Calibration

During 1964-65 a continuing investigation was performed to examine the feasibility of obtaining information on the time-changing characteristics of the aurora and night air glow by low-light level image orthicons at the Radio-Optical Observatory of the General Electric Company's Research and Development Center in Schenectady, New York. Although no auroras were detected during this interim period, wavelength and intensity calibrations on a spectrograph of special design using the image orthicon detector were accomplished with spectral lamps and night air glow emissions. Included spectral photographs of night air glow demonstrate that the image orthicon is at least 1000 times faster than photographic film when detecting weak 'point' or 'line' sources under high contrast conditions. Twenty photoelectrons are sufficient to record a spectral line. Sensitivity calibrations were also performed on a 16 in f/20 telescope, where the North Polar Sequence of Stars provided a standard calibrated star field. Within 10 seconds, 18th magnitude stars were detected. Further analysis is given on the data recorded during the September 1963 aurora and initially reported in the Final Report of Phase I, 1963 - AFCRL 64-209. (Author)

AD-631 061 Fld. 4/1, 20/14, 22/2
CFSTI Prices: HC $2.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
DIRECT SOUNDING STUDIES OF THE IONOSPHERE.
Research translation,
by Chou Wei. Sep 65, 46p. Rept. no. Emm-65-28,
Contract AF 19 (628)-5073,
TT 66-61010

Unclassified report

Trans. of Ti Ch'iu Wu Li Hsueh Pao (Chinese People's Republic) v12 n1 p100-17 1963.

Descriptors: (*Atmospheric sounding, *Ionosphere), (*Radio waves, Ionospheric propagation), Sounding rockets, Scientific satellites, Space environmental conditions, Measurements, State-of-the-art reviews, China

This paper describes various methods for studying the ionosphere and radio wave propagation using rockets and artificial satellites. It shows the relationships between these methods and illustrates certain essential results which have been obtained so far. It also discusses briefly the future trend in further studies on this subject. (Author)

AD-630 603 **See Fld. 20/6**

AD-630 904 **See Fld. 7/4**

AD-630 997 **See Fld. 7/4**

AD-631 047 **See Fld. 20/14**

AD-631 062 **See Fld. 8/14**

AD-631 095 **See Fld. 20/14**

AD-631 170 **See Fld. 20/14**

4/2. METEOROLOGY

AD-630 552 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
SOME RESULTS OF CALCULATION OF THE RADIATIONAL VARIATION OF TEMPERATURE IN THE ATMOSPHERIC BOUNDARY LAYER.
Research translation,
by R. M. Kazhdan, and F. N. Shekhter. Jan 66, 16p. Rept. no. T-R-488,
Contract AF 19 (628)-3880,
TT 66-60834

Unclassified report

Nekotorye Rezultaty Rascheta Radiatsionnogo Izmeeneniya Temperatury v Pogranichnom Sloe Atmosfery, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n127 p26-34 1962.

Descriptors: (*Radiation (Heat transfer), *Atmospheric temperature), Atmosphere, Boundary layer, Surface area, Lapse rate, Temperature inversion, Meteorology, USSR

The results of calculation of the radiational variations of temperature are analyzed for various atmospheric stratifications. In the presence of superadiabatic lapse rates and temperature inversions in the atmospheric surface boundary layer, the thermometric conductivity leads to a marked instability near the ground. (Author)

AD-630 553 Fld. 4/2, 17/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
PASSIVE-REFLECTOR EXPERIMENTS IN RADAR MEASUREMENT OF THE TURBULENCE OF THE CLEAR SKY.
Research translation,
by G. A. Smirnova. Jan 66, 16p. Rept. no. T-R-517,
Contract AF 19 (628)-3880,
TT 66-60835

Unclassified report

Opyty Radiolokatsionnogo Izmereniya Turbulentnosti Iasnogo Neba s Pomoshchiu Passivnykh Otrazhatelei, trans. of Tsentralnaya Aerologicheskaya Observatoriya. Trudy (USS) n57 p72-6 1964.

Descriptors: (*Clear air turbulence, *Radar scanning), (*Meteorological radar, Clear air turbulence), Atmospheric motion, Radar reflectors, Radar tracking, radar echo areas, Correlation techniques, Passive, USSR

Some results of radar investigation of the atmospheric turbulence of the clear sky are presented and compared with data from aircraft observations. (Author)

AD-630 554 Fld. 4/2, 17/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
POSSIBILITY OF RADAR DETERMINATION OF VISIBILITY IN FOGS.
Research translation,
by G. I. Kulikova, E. G. Palagin, E. A. Paliakova, and E. M. Salman. Jan 66, 12p. Rept. no. T-R-534,
Contract AF 19 (628)-3880,
TT 66-60836

Unclassified report

K Voprosu o Vozmozhnosti Radiolokatsionnogo Opredeleniya Meteorologicheskoi Dalnosti Vidimosti v Tumanakh, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n173 p71-5 1965.

Descriptors: (*Fog, *Radar scanning), (*Meteorological radar, Fog), All-weather aviation, Visibility, USSR

The feasibility of radar determination of visibility in fogs is examined. The fundamental possibility of detection of fogs at short ranges is demonstrated. Correlations are established between optical and radar characteristics of fogs. Approaches to the development of a radar method are pointed out. (Author)

AD-630 555 Fld. 4/2
CFSTI Prices: HC $2.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
FLUCTUATIONS OF THE LARGE-DROPLET COUNT IN STRATIFORM CLOUDS.
Research translation,
by M. I. Dekhtiar, and M. V. Buikov. Jan 66, 32p. Rept. no. T-R-538,
Contract AF 19 (628)-3880,
TT 66-60837

Unclassified report

O Fluktuatsiyakh Chilsa Krupnykh Kapel v Oblakakh Sloistykh Form, trans. of Ukrainskii Nauchno-Issledovatelskii Gidro-Meteorologicheskii Institut. Trudy (USSR) n48 p21-38 1965.

Descriptors: (*Stratus clouds, Moisture), Liquids, Water, Drops, Distribution, Oscillation, Meteorological parameters, Correlation techniques, USSR

The relative fluctuations of the number of large droplets in stratiform clouds are examined for a nonturbulent atmosphere. The principal physical parameters of a cloud (liquid-water content, thickness, and velocity of ordered air flows) are regarded as random correlated quantities distributed according to a normal law. Formulas are obtained that relate the relative fluctuations of the number of large droplets to the relative fluctuations of the principal physical parameters of a cloud. It is shown that this can be used to explain the relatively wide fluctuations of the number of large droplets observed in experiment. (Author)

AD-630 617 Fld. 4/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
INITIATION OF PRECIPITATION IN VIGOROUS CONVECTIVE CLOUDS.
Environmental research papers (revised ed.),
by Keith A. Browning, and David Atlas. 26 Jul 65, 11p. Rept. no. AFCRL-ERP-172,AFCRL-66-126
Proj. AF-6672, Task 667205,

Unclassified report

Revision of manuscript submitted 17 Feb 65.

Availability: Published in Journal of the Atmospheric Sciences v22 n6 p678-83 Nov 1965. Copies to DDC users only.

Descriptors: (*Clouds, Radar scanning), (*Meteorological radar, Clouds), (*Storms, *Convection (Atmospheric)), Atmospheric precipitation, Ice, Water vapor, Radar echo areas, Meteorology

The origin of a severe local storm is traced back to a cluster of three shower cells, each of which produced a first radar echo close to the -30C level. This level is much higher than that associated with the majority of convective clouds studied by other workers. The great height of the first echoes is attributed to the presence of strong updrafts which carry the cloud particles to high levels in the time taken for them to grow to radar detectable sizes. Because of their low temperatures, the first echoes were probably due to ice particles. Echo intensification in each cell was fairly rapid during the minute or so after first detection and corresponded to the growth of these particles by gravitational accretion in the presence of a liquid water concentration equal to about half the adiabatic value. In each cell the reflectivity core due to the growing particles was balanced by the updraft at a constant level for a 5-min period following first detection, after which it descended to the ground with very little further growth. The low reflectivity of the echo core in relation to its rate of descent is interpreted as being due mainly to a smaller-than-usual particle concentration. (Author)

AD-630 618 Fld. 4/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
ACTIVITIES IN RADAR METEOROLOGY, CLOUD PHYSICS, AND WEATHER MODIFICATION IN THE SOVIET UNION (JUNE 1965).
Special repts.,
by David Atlas. Feb 66, 15p. Rept. no. AFCRL-SR-42
Proj. AF-6672, Task 667204,

Unclassified report

Availability: Published in Bulletin of the American Meteorological Society v40 n11 p696-700 Nov 1965. Copies to DDC users only.

Descriptors: (*Meteorological radar, USSR), (*Artificial precipitation, USSR), (*Clouds, Scientific research), Meteorology

AD-630 660 Fld. 4/2
CFSTI Prices: HC $14.60 MF $1.00
DOUGLAS AIRCRAFT CO INC SANTA MONICA CALIF MISSILE AND SPACE SYSTEMS DIV
THE EVOLUTION OF CUMULUS CLOUDS: A NUMERICAL SIMULATION AND ITS COMPARISON AGAINST OBSERVATIONS.
Final rept.,
by F. W. Murray, and A. B. Hollinden. Mar 66, 149p. Rept. no. SM-49372,
Contract Nonr-4715 (00) (X)

Unclassified report

Descriptors: (*Cumulus clouds, Mathematical models), Tropical regions, Hydrodynamics, Thermodynamics, Meteorological parameters, Programming (Computers), Atmospheric sounding, Theory, Correlation techniques

Atmospheric thermal convection on the cumulus scale is investigated by numerical solution of the appropriate equations of hydrodynamics and thermodynamics. Initial conditions are based on real or synthetic atmospheric soundings. The one case of synthetic data studied was included to compare the model with a previous simpler model. The other cases are based on actual tropical maritime soundings, two of which correspond with conditions studied by the Naval Research Laboratory by means of instrumented aircraft. The simulated clouds are found to agree in many respects with the real clouds, and in those details in which they disagree possible explanations in terms of limitations of the model and of techniques of aerial observation are discussed. Among the features discussed in some detail are eddy transfer mechanism and the effects of multiple impulses. Recommendations are made for further improvement to the model and for additional field observations. It is concluded that this type of numerical study combined with aerial observation of real clouds offers a very effective method for the study of cumulus dynamics. (Author)

AD-630 667 Fld. 4/2
CFSTI Prices: HC $3.00 MF $0.75
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
THE PULSATION SPECTRA OF THE VERTICAL COMPONENT OF WIND VELOCITY AND THEIR RELATIONS TO THE MICRO-METEOROLOGICAL CONDITIONS.
Research translation,
by A. S. Gurvich. Jan 66, 60p. Rept. no. T-R-509,
Contract AF 19 (628)-3880,
TT 66-60901

Unclassified report

Spektry Pulsatsii Vertikalnoi Komponenty Skorosti Vetra i Ikh Sviazi s Mikrometeorologicheskimi Usloviyami, trans. of Akademiya Nauk SSSR. Institut Fiziki Atmosfery. Trudy, n4 p101-36 1962.

Descriptors: (*Micrometeorology, Meteorological parameters), Wind, Oscillation, Statistical analysis, USSR

AD-630 668 Fld. 4/2, 14/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
BALLOON-BORNE ELECTRIC METEOROGRAPH.
Research translation,
by A. A. Ledokhovich. Feb 66, 9p. Rept. no. T-R-586,
Contract AF 19 (628)-3880,
TT 66-60902

Unclassified report

Aerostatnyi Elektricheskii Meteorograf, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n154 p105-8 1964.

Descriptors: (*Meteorological balloons, Instrumentation), (*Atmospheric sounding, Meteorological balloons), (*Telemeter systems, Meteorological balloons), Meteorological instruments, USSR

The design of the balloon-borne electric meteorograph described herein includes a special cable that transmits the data of the meteorological measurements directly to the ground at the instant of measurement. (Author)

AD-630 670 Fld. 4/2, 17/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
SOME PROBLEMS OF RADAR MEASUREMENT OF WIND VARIATIONS IN THE TROPOSPHERE.

Research translation,
by Iu. V. Melnichuk. Jan 66, 14p. Rept. no. T-R-513,
Contract AF 19 (628)-3880,
TT 66-60904

Unclassified report

Nekotore Voprosy Izmereniya Pulsatsii Vetra v Troposfere Radiolokatsionnym Metodom, trans. of Tsentralnaya Aerologicheskaya Observatoriya. Trudy (USSR) n57 p41-8 1964.

Descriptors: (*Meteorological radar, Wind), (*Wind, Measurement), Atmospheric motion, Troposphere, Radar scanning, Radar echo areas, USSR

An apparatus for counting the number of passages through some given level by the envelope of the radar echo from a cloud of moving scatterers is examined theoretically. It is shown that the number of times the envelope passes through the average value is proportional to the root mean square of the projections of the relative or absolute speeds of the scatterers in the scattering volume onto the beam axis, depending on whether conventional or Doppler radars are used. During the investigation of wind variations, the number of these passages is proportional to the mean wind speed in the scattering volume. The effect of averaging in the scattering volume upon the energy spectrum of wind variations is also considered. (Author)

AD-630 671 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
LOCAL FORECASTING OF FOG FORMATION.
Research translation,
by M. E. Berliand, V. P. Gracheva, and G. A. Fateeva. Jan 66, 22p. Rept. no. T-R-490,
Contract AF 19 (628)-3880,
TT 66-60905

Unclassified report

Lokalnyi Prognoz Obrazovaniya Tumanov, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n127 p57-68 1962.

Descriptors: (*Fog, *Weather forecasting), Micrometeorology, Meteorological parameters, Mathematical prediction, USSR

After proposing an improved method for precomputing fogs on the basis of observations from a single station, the authors derive a technique for forecasting the nocturnal variation of the specific humidity, refine the means of forecasting the nocturnal minimum temperature of the atmospheric surface boundary layer, and present the results of checking the method against observational data from a number of weather stations. (Author)

AD-630 672 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
THUNDERSTORM ACTIVITY OVER THE EUROPEAN USSR.
Research translation,
by V. A. Solovev. Jan 66, 20p. Rept. no. T-R-548,
Contract AF 19 (628)-3880,
TT 66-60906

Unclassified report

Grozovaya Aktivnost nad Evropeiskoi Territoriei SSSR, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n163 p76-86 1964.

Descriptors: (*Thunderstorms, USSR), Climatology, Meteorology

Charts of thunderstorm activity as a function of the number of thunderstorm centers are plotted on a trial basis from lightning-recorder data. Information is given on the number and duration of thunderstorms and the number of days with thunderstorms by five-degree geographic squares of the European USSR on the basis of weather-station data. (Author)

AD-630 673 Fld. 4/2, 17/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
SOME RESULTS OF RADAR MEASUREMENT OF PRECIPITATION PER UNIT AREA.
Research translation,
by L. M. Volynets, M. L. Markovich qqd Z. M. Muchnik. Feb 66, 16p. Rept. no. T-R-524,
Contract AF 19 (628)-3880,
TT 66-60907

Unclassified report

Nekotore Rezultaty Izmerenii Kolichestva Osadkov po Ploshchadi Radiolokatsionnym Metodom, trans. of Ukrainskii Nauchno-Issledovatelskii Gidro-Meteorologicheskii Institut. Trudy (USSR) n47 p51-8 1965.

Descriptors: (*Meteorological radar, Rainfall), (*Rainfall, Radar scanning), Atmospheric precipitation, Spectrum signatures, USSR

The relation of the accuracy of radar measurements of shower precipitation to the area surveyed and the time interval between measurements is examined. Areas of 81 to 648 sq km and time intervals of 2 to 10 min are analyzed. (Author)

AD-630 675 Fld. 4/2, 17/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
RADAR ECHO CHARACTERISTICS OF CLOUDS.
Research translation,
by R. V. Ignatova, V. A. Petrushevskii, and E. M. Salman. Jan 66, 16p. Rept. no. T-R-536,
Contract AF 19 (628)-3880,
TT 66-60909

Unclassified report

Radiolokatsionne Priznaki Kharaktera Oblachnosti, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n173 p26-33 1965.

Descriptors: (*Clouds, *Radar echo areas), (*Meteorological radar, Clouds), Meteorological phenomena, Radar scanning, Spectrum signatures, USSR

The article treats the quantitative characteristics of the radar echo in various forms off clouds. It is shown that the vertical profile of the reflectivity can be used as one of the criteria for determining the form of clouds. (Author)

AD-630 676 Fld. 4/2, 17/9
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
EFFECTIVENESS AND RELIABILITY OF RADAR OBSERVATIONS OF NON-PRECIPITATING CLOUDS.
Research translation,
by R. V. Ignatova, and V. A. Petrushevskii. Jan 66, 14p. Rept. no. T-R-522,
Contract AF 19 (628)-3880,
TT 66-60910

Unclassified report

Effektivnost i Obespechennost Radiolokatsionnykh Obnaruzhenii Oblakov, ne Daiushchikh Osadkov, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n173 p3-8 1965.

Descriptors: (*Clouds, Radar scanning), (*Meteorological radar, Clouds), Effectiveness, Reliability, Meteorology, USSR

The present paper deals with determination of the effectiveness and reliability of cloud observations; experimental data are given on the observation of various cloud types using weather radars, and the method of carrying out radar observations of clouds is discussed. (Author)

AD-630 706 Fld. 4/2, 14/2
CFSTI Prices: HC $2.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF METEOROLOGY
MEASUREMENT OF DROP SIZE DISTRIBUTIONS IN NATURAL CLOUDS AND RAIN.
Final rept. Apr 64-Mar 65,
by D. P. Keily. 31 Mar 65, 25p. Contract AF 19 (628)-4085, Proj. AF-8620, Task 862006, AFCRL 65-921

Unclassified report

Descriptors: (*Fog, Particle size), (*Aerosols, Particle size), (*Clouds, Moisture), (*Raindrops, Particle size), Meteorological instruments, Probes (Electromagnetic), Electrometers, Electronic recording systems

Some fog drop size distributions taken during Operation Catfeet are presented. Calibration droplets with a range of positive and negative charges may be generated by control of the bulk water supply voltage, without affecting the response of the electrostatic probe used to size and count them. (Author)

AD-630 813 Fld. 4/2, 16/1, 19/4, 14/2
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS RESEARCH AND DEVELOPMENT ACTIVITY WHITE SANDS MISSILE RANGE N MEX
U. S. ARMY PARTICIPATION IN THE METEOROLOGICAL ROCKET NETWORK.
Jan 66, 22p. Task DA-1V650212A127-03, ECOM 5028

Unclassified report

Descriptors: (*Army research, Atmospheric sounding), (*Atmospheric sounding, Sounding rockets), (*Sounding rockets, Atmospheric sounding), Ballistics, Meteorology, Guided missile ranges, New Mexico, Climatology

AD-630 858 Fld. 4/2
CFSTI Prices: HC $2.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
SPRING-WOUND PSYCHROMETER, GOST 6353-52 AND ELECTRIC PSYCHROMETER M-34.
Mar 66, 22p. Rept. no. FSTC-HT-23-54-66, Proj. 2301-6553,
TT 66-60963

Unclassified report

Trans. of mono. Psikhrometer Aspiratsionnyi s Elektromotorom M-34 Gidrometeoizdat, n. p. n. d.

Descriptors: (*Hygrometers, USSR), Electric motors, Springs, Humidity, Air, Thermometers, Temperature

These articles describe two almost identical wet and dry bulb comparison psychrometers. In each unit, a fan draws the surrounding air up through a tube past the wet and dry bulb thermometers, and tables or a special graph are used to determine the humidity, both relative and absolute, of the air. The essential difference between the two instruments is that one is spring-wound, the other has an electric motor. (Author)

AD-631 030 Fld. 4/2
CFSTI Prices: HC $1.10 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
A PRELIMINARY STUDY OF THE MEDIUM-RANGE FORECAST OF SUMMER PRECIPITATION IN EASTERN CHINA.
1956, 4p. Rept. no. TRANS-EMM-65-48 (a), Contract AF 19 (628)-5073,

Unclassified report

Translated summary and table of contents appearing in the monograph. Reprinted from the Science Press, Peking (China). 72p. 1956.

Descriptors: (*Climatology, *China), (*Weather forecasting, China), Meteorology, Atmospheric precipitation

This monograph presents a preliminary study of medium-range weather prediction in China based on the Multanovskii-Pagava method coupled with the characteristics of large-scale weather processes over eastern Asia. It discusses the problems of medium-range forecast of summer precipitation in eastern China with special emphasis laid upon the relationship between the precipitation processes and the upper-level weather processes. An example of actual prediction is given. This monograph which contains 86 figures, 9 tables and 15 references may be used in research and preparation for medium-range weather forecasts in China. (Author)

AD-631 031 Fld. 4/2
CFSTI Prices: HC $1.10 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
TRANSLATED SUMMARY AND ABSTRACTS OF ARTICLES APPEARING IN THE MONOGRAPH: A COLLECTION OF ARTICLES ON DYNAMIC METEOROLOGY,
by Koo Chen-chao. 1961, 8p. Rept. no. Emm-65-50 (a),
Contract AF 19 (628)-5073,
TT 66-61006

Unclassified report

Descriptors: (*Meteorology, China), Bibliographies, Cybernetics, Weather forecasting, Thermodynamics, Atmospheric motion

The first part of this monograph consists of three articles. The first two articles discuss certain problems in meteorology from the point of view of cybernetics. In the second article, the technique of transfer function in automatic control theory is used to analyze a linear model for long-range numerical prediction. In the third article, the instability problem of large-scale atmospheric processes is investigated using Liapounoff's theory of stability. The second part of this monograph contains four articles dealing with processes of atmospheric heating and problems involved in long-range numerical prediction.

AD-631 032 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
A STUDY OF THE MICROPHYSICAL MECHANISM OF WARM-CLOUD PRECIPITATION,
by Chou Hsiu-chi. 1964, 4p. Rept. no. Trans-EMM-65-51 (a),
Contract AF 19 (628)-5073,

Unclassified report

Translated summary and table of contents appearing in the monograph. Reprinted from The Science Press, Peking (China). 1964. 105p.

Descriptors: (*Clouds, *Atmospheric precipitation), (*China, Meteorology), Climatology

This monograph on modern meteorology contains a summary of the results of a study of the microphysical mechanism of warm-cloud precipitation in China during the past three years. Included is a critical survey of the related topics investigated in other countries. The monograph begins with a discussion of the characteristics of the stochastic growth of cloud droplets, followed by a review of the theories of cloud-droplet growth. The effect of a fluctuating humidity distribution on condensation growth, the collision and coalescence growth in a fluctuating density field, a turbulence field and due to fluctuating vertical current, and the mechanism for cloud droplet electrification together with the effect of electric charge on collision and coalescence growth are examined. On the basis of the results obtained, a more general statistical theory of warm-cloud precipitation is proposed. This theory, when compared with the past theory of gravitational collision and coalescence, permits a more objective generalization of facts. The concept of stochasitc process introduced in this theory can also be extended to the study of the microphysical processes of cool-cloud precipitation. The theoretical analysis of these problems offers a new approach to the understanding and further study of the microphysical processes of cloud and fog precipitation. (Translator)

AD-631 058 Fld. 4/2
CFSTI Prices: HC $2.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
THE EFFECTS OF THERMAL STRATIFICATION ON THE TURBULENT EXCHANGE IN A DIABATIC SURFACE LAYER.
Research translation,
by Su Tsung-shian. Nov 65, 30p. Rept. no. Emm-65-42,
Contract AF 19 (628)-5073,
TT 66-61007

Unclassified report

Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v33 n4 p435-48 1963.

Descriptors: (*Atmospheric motion, *Thermodynamics), Meteoroiogy, Boundary layer, Turbulence, China

This paper studies the effects of stratification on the turbulent exchange in the surface layer of the atmosphere using the similarity theory and dimensional analysis. Using recently published data, the magnitudes of the empirical coefficient D in the general function of turbulent exchange are calculated. A scheme of transition from forced to free convection showing a rather smooth character is developed. Based on the characteristic length L sub Ri, the author sets up a turbulent exchange model for a diabatic surface layer. (Author)

AD-631 059 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
TURBULENT DIFFUSION FROM A CONTINUOUS POINT SOURCE IN THE PRESENCE OF VERTICAL ADVECTION.
Research translation,
by Lo Hsui-ch'ing. Nov 65, 15p. Rept. no. Emm-65-17,
Contract AF 19 (628)-5073,
TT 66-61008

Unclassified report

Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v33 n3 p375-81 1963.

Descriptors: (*Diffusion, *Atmospheric motion), Turbulence, Atmosphere, Transport properties, Aerosols, Meteorology, China

This paper discusses the problem of diffusion from an unsteady continuous point source in a turbulent atmosphere. The influence of vertical current, the deposition of the diffusing particles and the 'Net-catching Effect' (absorption by ground surface) are considered. The theoretical formulas for the evaluation of the concentration field are derived. Several sample computations are presented and it is shown that there is good agreement between the computed results and observed data. (Author)

AD-631 060 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
TURBULENCE IN THE SURFACE LAYER OF A STRATIFIED ATMOSPHERE.
Research translation,
by Su Tsung-shian. Nov 65, 21p. Rept. no. Emm-65-41,
Contract AF 19 (628)-5073,
TT 66-61009

Unclassified report

Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v29 n2 p73-82 1958.

Descriptors: (*Turbulent boundary layer, *Atmospheric motion), Thermodynamics, Micrometeorology, Atmosphere, Meteorology, China

This paper discusses turbulent exchange in the surface layer of a stratified atmosphere. First, considering the effect of thermal stratification on turbulence, a new form of function of the Richardson number is derived from the energy balance equation of a turbulent atmosphere. Secondly, a reasonable function is proposed describing the vertical distribution of elements in the stratified atmospheric surface layer. Several graphs are also given which make an accurate calculation of the turbulent characteristic values possible, such as turbulent exchange based on the observed data. Some computations based on observed data are furnished for comparison with others. It is shown that the treatment in this paper is reasonable and the results are better than those of Monin and Obukhov. (Author)

AD-631 085 Fld. 4/2
CFSTI Prices: HC $2.00 MF $0.50
COLORADO STATE UNIV FORT COLLINS DEPT OF ATMOSPHERIC SCIENCE
SOUTHEAST ASIA MONSOON STUDY.
Technical rept. no. 2, 1 Sep-31 Dec 65,
by Herbert Riehl. Feb 66, 38p. Contract DA-28-043-AMC-01303 (E), Proj. 28043-MC-00813 (E) ,DA-1V0-14501-B-53A-09

Unclassified report

Descriptors: (*Southeast Asia, *Climatology), (*Tropical cyclones, Southeast Asia), Air mass analysis, Meteorology

The objective of this program has been to investigate the following aspects of this seasonal reversal: (1) Definition of the onset of the summer monsoon over Southeast Asia and statistical analysis of onsets; (2) Role of the tropical cyclone during the onset; (3) Seasonal changes of upper-air currents over Asia and the differences which may exist between late and early onset years; (4) Influence of seasonal heating and changes in thermodynamic structure of the atmosphere over southern Asia during onsets. (5) Retardation of the monsoon over India as compared with Southeast Asia. Generally, three types of synoptic disturbances can be found over Southeast Asia. The warm core case has been described in this series of technical reports (1); the cold core case will be studied next. The third case, the equatorial shearline (equatorial convergence zone) is the object of this study. Its purpose is to determine the average field of motion and the distribution of precipitation on a cross-section normal to the shearline. (Author)

AD-631 094 Fld. 4/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
LONG-WAVE RADIATION EXCHANGE NEAR THE GROUND.
Environmental research papers,
by William P. Elliott, and Donald W. Stevens.
1965, 8p. Rept. no. AFCRL-66-154,AFCRL-ERP-176
Proj. AF-7655, Task 765503,

Unclassified report

Presented at the Solar Energy Conference Phoenix, Arizona, 15-17 Mar 1965. See also AD-269 035.

Availability: Published in Solar Energy v10 n1 p5-8 Jan 1966. Copies to DDC users only.

Descriptors: (*Infrared radiation, Earth), (*Micrometeorology, Infrared radiation), Temperature, Surface properties, Atmosphere, Emissivity, Water vapor

Very small percentage changes in the vertical flux of radiant energy can give rise to temperature changes which are meteorologically significant. If radiation-flux divergence were the only process operating to change the temperature it is possible that changes on the order of 10C per hour could be found a few feet above the ground. Development of instruments capable of measuring this radiation flux divergence is not the only requirement. To use the measurements meaningfully and to be able to predict the temperature changes requires a knowledge of the emissivity of water vapor at very low path lengths at normal sea-level pressures and temperatures. Another factor that appears to be absolutely crucial is the emissivities of natural surface in the long-wave region. It is customary to assume this emissitivity to be essentially unity but there is evidence that this is not so. The importance of determining emissivity values is seen by considering the problem of the growth of the nocturnal inversion. Computations of the height and strength of this inversion are seen to be critically dependent on assumed values of this emissivity. It is interesting to note that a significant inversion can result from radiation processes alone. (Author)

AD-631 116 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
AN ANALYSIS OF THE VARIOUS FACTORS IN RAIN FORMATION WITH RESPECT TO FLUCTUATIONS OF THE VERTICAL CIRCULATION.
Research translation,
by Hsu Hua-ying. 1966, 12p. Rept. no. Emm-65-26,
Contract AF 19(628)-5073,
TT 66-61020
Unclassified report

Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v34 n3 p378-82 1964.

Descriptors: (*Raindrops, Meteorological parameters), Clouds, Moisture, Atmospheric motion, Atmospheric condensation, China

It was pointed out in a previous work that fluctuations of the ascending air current play an important role in the formation of precipitation elements in a shallow warm cloud. Based on this concept this paper further analyzes the effects of the various factors involved. It is shown that precipitation can develop only when there is an optimum combination of such parameters as the fluctuation of the vertical velocity, the average vertical velocity, the moisture content in the cloud and the cloud thickness. The paper discusses particularly the effect of the fluctuation on the raindrop spectrum. It appears that if the fluctuation is too great it will not benefit rain formation. (Translator)

AD-631 117 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
A PRELIMINARY STUDY OF THE FORMATION OF PRESSURE JUMPS BY A SMALL MOUNTAIN IN A TWO-LAYER MODEL.
Research translation,
by Chao Jih-ping, Chang Kung-Kuan, and Yan Shiao-ming. Feb 66, 20p. Rept. no. Emm-65-37,
Contract AF 19(628)-5073,
TT 66-61021
Unclassified report

Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v34 n2 p233-41 1964.

Descriptors: (*Micrometeorology, *Mountains), Atmospheric motion, Barometric pressure, Perturbation theory, Atmosphere models, Mathematical models, China

In this paper the influence of a small mountain on the airflow above is examined by means of a two-layer model. The one-dimensional solution for the steady state reveals that the degree of perturbation in the airflow in a mountainous region is determined by the upstream conditions as well as the height of the mountain. Provided that the height of the mountain reaches a critical value, a stationary pressure jump will occur on the lee side when the Froude number of the upwind side is less than 1. The occurrence of the pressure jump is then examined by means of a one-dimensional solution for the unsteady state. (Author)

AD-631 118 Fld. 4/2
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
A DYNAMIC ANALYSIS OF THE DEVELOPMENT OF CUMULONIMBUS INCUS.
Research translation,
by Li Shing-sheng, Chao Jih-ping, and Hwu Yiin-Chyau. Feb 66, 20p. Rept. no. Emm-65-36,
Contract AF 19(628)-5073,
TT 66-61022
Unclassified report

Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) v34 n2 p225-32 1964.

Descriptors: (*Cumulonimbus clouds, Dynamics), Mathematical models, Nonlinear differential equations, Thermodynamics, Meteorology, China

This paper analyzes the development of the cumulonimbus incus using an approximate solution of the non-linear differential equations of cumulus dynamics in which the latent heat of condensation is considered. It is shown that the incus structure is a necessary consequence of a strong cumulus development. (Author)

AD-630 636 See Fld. 17/2

AD-630 669 See Fld. 12/1

AD-630 674 See Fld. 17/9

AD-631 014 See Fld. 8/3

AD-631 181 See Fld. 13/2

Field 5-BEHAVIORAL AND SOCIAL SCIENCES

5/1. ADMINISTRATION AND MANAGEMENT

AD-630 653 Fld. 5/1, 20/3, 20/12, 9/5
CFSTI Prices: HC $4.60 MF $0.50
NAVAL ORDNANCE LAB CORONA CALIF
FOUNDATIONAL RESEARCH PROJECTS, OCTOBER-DECEMBER 1965.
Quarterly rept.
1 Mar 66, 42p. Task R360-FR-104/211-1/R011-01-01,
NAVWEPS 8847
Unclassified report

See also AD-625 952.

Descriptors: (*Magneto-optic effect, Lasers), (*Magnetic fields, Films), (*Cerium, Spectrum (Infrared)), (*Antennas, Waveguides), Ferromagnetism, Laboratory equipment, Optical equipment, Lanthanum compounds, Cerium compounds, Fluorides, Absorption spectrum, Microwave equipment, Antenna radiation patterns

Contents: Magneto-optical observations with a ten-milliwatt helium-neon laser, by J. L. Tomlinson; Improved system for observation of high-speed magnetization reversal, by G. H. Moore; Infrared Absorption of Ce (3+) in LaF3 and of CeF3, by R. A. Buchanan, H. E. Rast, and H. H. Caspers; Synthesis study of a continuous-source waveguide antenna, by A. P. Boblett.

AD-630 757 Fld. 5/1, 14/1
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
ORGANIZATIONAL STRUCTURES AND PLANNING,
by James R. Schlesinger. 25 Feb 66, 47p. Rept. no. P-3316,
Unclassified report

Prepared for discussion at the Universities - National Bureau of Economic Research Conference on the Economics of Defense, to be held at the Univ. of Chicago, April 15-16 1966.

Descriptors: (*Department of Defense, *Management planning), Economics, Decision making, Costs, Cost effectiveness, Military organizations, Armed Forces (United States), Armed Forces operations, History, Air Force, Armed Forces budgets

The purpose of the paper is to consider the influence that organizational structure has upon planning, particularly as implied by experience of the Department of Defense since 1961. One objective of the Departments reorganization was to achieve better coordination of interrelated decisions than which 'bargaining' among the armed services could provide. Another was to improve choices in general by (1) looking at full-cost rather than down-payment implications of alternative policies, (2) costing in terms of programs or outputs rather than inputs, and (3) systematically considering alternatives and tradeoffs in terms of cost effectiveness. Aside from the intelligence, reasonableness, and perceptiveness of personnel, three major factors are listed as influencing an organization's ability successfully to plan in a precise and monolithic manner: (1) size and internal structure of the organization, (2) dimensions of the planning problem and the stability of functional relationships, and (3) existence and responsiveness of rivals and the organization's ability to anticipate or perceive such responses or to make the adjustments necessary. Implications for defense planning are treated, as are bureaucratic problems that have arisen in the different methods of planning and management. The centrally controlled planning in the Department of Defense since 1961 is regarded as one of the major planning experiments of all time.

AD-630 796 Fld. 5/1
CFSTI Prices: HC $2.60 MF $0.50
ILLINOIS UNIV URBANA GROUP EFFECTIVENESS RESEARCH LAB
THE SIGNIFICANCE OF ROLE BEHAVIOR DIFFERENTIATION FOR CROSS-CULTURAL INTERACTION TRAINING.
Technical rept.,
by Uriel G. Foa, and Martin M. Chemers. Mar 66, 26p. Rept. no. TR-22,
Contract DA-49-193-MD-2060,
Unclassified report

Descriptors: (*Culture, Training), Group dynamics, Perception (Psychology), Behavior, Attitudes, Learning, Sex, Training devices, Sociology, Social psychology, Middle East

In order to train people to deal effectively with persons from another culture, it appears necessary to identify cross-cultural differences which are critical to the working of culturally heterogeneous groups. A theoretical analysis of the development of role differentiation, within and between social systems, in traditional and modern cultures, leads to the hypotheses that traditional cultures stress differentiation of the roles of the same system, while modern culture tends to empathize differentiation of comparable roles of different systems. These hypotheses were tested on the content of a cultural training program found to be effective in improving an individual's performance and interpersonal relations in heterocultural task groups.

This training program is composed of 55 problem episodes to be interpreted for causes of conflict by the trainee. The problem episodes were derived from 'critical incident' interviews with individuals who had had cross-cultural experience, as well as from the relevant literature on the target culture, the Middle East. The results support the hypotheses and suggest that role differentiation may constitute an important area for cross-cultural training. A facet analysis of the content of the training program is presented and used in formulating proposals for a systematization of the program. (Author)

AD-630 918 Fld. 5/1, 9/2, 17/9, 13/13, +
CFSTI Prices: HC $6.60 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
GENERAL RESEARCH.
Quarterly technical summary rept. 1 Nov 65-31 Jan 66,
by Frederick C. Frick, V. Alexander Nedzel, Stephen H. Dodd, Melvin A. Herlin, and Jerome Freedman. 15 Feb 66, 61p. Contract AF 19 (628)-5167, Proj. AF-649L
ESD TDR-66-31
Unclassified report

See also AD-627 520.

Descriptors: (*Data processing systems, Scientific Research), (*Radar, Scientific research), (*Engineering, Scientific research), (*Solid state physics, Scientific research), Digital computers, Computer storage devices, Psychology, Control systems, Space surveillance systems, Radio astronomy, Moon, Planets, Microwave equipment, Microwave amplifiers, Millimeter waves, Antenna feeds, Radar antennas, Semiconductor devices, Opdar, Radar stations, Guided missile launchers, Optics, Materials

Summaries are given of progress and results in the following research areas: digital computers (computer systems, circuit development, magnetic film engineering, system programming and applications); computer components (magnetic films, optics, electron transport); psychology (man-computer interaction, human information processing); control research (computation center development, hybrid computational facility); surveillance techniques (space surveillance, lunar studies, planetary studies, atmospheric studies, radio astronomy); microwave components (haystack microwave components, solid-state amplifiers, millimeter-wavelength program, modification to TRADEX error horns); mechanical engineering (haystack, solid state research, laser radar, structures research); physical plant engineering (haystack hill, Millstone Hill); control systems (Nike-Ajax optical mount, Haystack); solid state device research; optical techniques and devices; materials research; physics of solids.

AD-631 079 Fld. 5/1, 15/5
CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION
TEAM DECISION MODELS OF AN INVENTORY SUPPLY ORGANIZATION.
Management science research rept.,
by Charles H. Kriebel. 1965, 17p. Contract Nonr-760 (24) Proj. NR-047-048,
Unclassified report

See also AD-616 112.

Availability: Published in Naval Research Logistics Quarterly v12 n2 p139-54 June 1965. Copies to DDC users only.

Descriptors: (*Inventory control, *Decision theory), (*Management engineering, Decision making), (*Information theory, Statistical analysis), Probability, Management planning, Costs, Linear systems, Distribution (Economics), Logistics

When uncertainty is a consideration in the normative analysis of decisions and information within organizations, 'best' programs of decision rules depend on the information structure which pertains to the organization. Under different information structures, different decision rule programs are optimal relative to the prevailing criteria of organization performance. Propositions from team decision theory may be employed advantageously to resolve behavioral issues in the formal description of organizational decision processes. In specifying the information structure of an organization within the analysis of team problems it becomes useful to distinguish between components of the data generating process and the information system. The framework of applied statistical decision theory provides an operational procedure for the normative analysis of alternative decision rule programs and information systems. These considerations are illustrated for a simple logistics organization with operating costs given by a constrained asymmetric linear function of inventory and demand. In particular, both normal and extensive form analyses of the team decision problem are detailed under several logistics information systems. (Author)

AD-630 821 **See Fld. 13/10**

AD-630 822 **See Fld. 13/10**

AD-631 090 **See Fld. 14/1**

5/2. DOCUMENTATION AND INFORMATION TECHNOLOGY

AD-630 521 Fld. 5/2, 9/2, 9/4, 5/7
CFSTI Prices: HC $4.00 MF $0.75
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH WASHINGTON D C DIRECTORATE OF INFORMATION SCIENCES
INFORMATION SCIENCES, 1965.
Annual rept. no. 3, 1965,
by Rowena Swanson. Jan 66, 108p. Proj. AF-9769,
AFOSR 66-0130
Unclassified report

See also AD-600 110, AD-616 883.

Descriptors: (*Documentation, Scientific research), (*Information retrieval, Scientific research), (*Information theory, Scientific research), Classification, Computers, Artificial intelligence, Adaptive systems, Linguistics

Summaries of projects current during calendar year 1965 are given within six categories: (a) information systems research, (b) information identification and classification, (c) transmission of information, (d) adaptive and self-organizing systems, (e) language and linguistics research, and (f) theoretical foundations of information sciences. (Author)

AD-630 761 Fld. 5/2, 9/2, 15/4
CFSTI Prices: HC $4.60 MF $0.50
ASTRO-ELECTRONICS DIV RADIO CORP OF AMERICA PRINCETON N J
A COMPUTER PROGRAM FOR INDEX GENERATION.
Feb 60, 48p. Rept. no. SR-60-1,
Contract DA-49-083-OSA-1183,
Unclassified report

Descriptors: (*Information retrieval, Programming (Computers)), (*Military intelligence, Information retrieval), (*Indexes, Subject indexing), Classification, Reports, Vocabulary

Project ACSI-MATIC of RCA has issued an index to the ACSI Subject Code, a subject listing used by the Office of the Assistant Chief of Staff for Intelligence. This index was automatically composed on an RCA 501 computer. The present report describes the details of the computer program at an unclassified level. The example used is the Dewey Decimal System of Classification. The development of this index program is a part of the ACSI-MATIC effort for determining more efficient ways of handling information in document form. The investigation of better techniques (both manual and machine) for recognizing subjects within documents, as well as for classifying the documents and being able to retrieve them according to their subject content is a necessary part of the ACSI-MATIC program. This report describes an efficient machine method of generating a useful tool for the storage and retrieval of documents. (Author)

AD-630 797 Fld. 5/2, 9/2
CFSTI Prices: HC $3.00 MF $0.75
UNIVAC BLUE BELL PA
OPTIMIZATION AND STANDARDIZATION OF INFORMATION RETRIEVAL LANGUAGE AND SYSTEMS.
Final rept.,
by Earl G. Fossum, and Gilbert Kaskey. 28 Jan 66, 95p. Contract AF 49 (638)-1194, Proj. AF-9769,
AFOSR 66-0628
Unclassified report

See also AD-287 117, AD-609 709, AD-609 710, AD-624 241.

Descriptors: (*Information retrieval, Effectiveness), (*Subject indexing, Effectiveness), Language, Reports, Optimization, Standardization, Statistical analysis, Word association

The report analyzes and evaluates methods of organizing data files, primarily for document retrieval applications. Three principal techniques are examined: the Multi-List System, the list-organized file, and the inverted and document-sequenced file. Statistical analyses were made of term associations based on 599 most common DDC descriptors. Results indicate the need of a large amount of processing against an extensive data base; since most documents have almost as many groups as index terms, the postulated reduction in lists traversing a given document cannot be realized. Analysis shows that the list-organized file is an amalgamation of the inverted and document-sequenced files, and that maintenance and use of the two separate files is more efficient when requirements cannot be met by the inverted file alone. A technique for optimizing organization of the two files to minimize actual computing and over-all elapsed processing times is described. It is viewed as dubious that any particular significance can be attached to a unique index term 'association.' There appears potential value in using relationships implicit in the hierarchic structure of a thesaurus, both for processing search requests and to aid in assigning descriptors by such techniques as 'lowest level indexing.' (Author)

AD-631 071 Fld. 5/2, 9/2
CFSTI Prices: HC $2.00 MF $0.50
THOMAS J WATSON RESEARCH CENTER YORKTOWN HEIGHTS N Y
TECHNIQUES FOR DOCUMENT RETRIEVAL RESEARCH: STATE OF THE ART.
Research rept.,
by Manfred Kochen. 31 Dec 63, 29p. Rept. no. RC-947,
Contract AF 19 (626)-10,
Unclassified report

Descriptors: (*Information retrieval, State-of-the-art reviews), Reports, Computer storage devices, Magnetic tape, Thermoplastics, Photochromism, Input-output devices, Programming languages, Programming (Computers), Subject indexing

Recently developed technologies and systems know-how for non-numeric information processing make it feasible to construct experimental systems and to plan scientific experiments which are realistic and of critical size. The great obstacle is still lack of an underlying scientific discipline to help formulate and analyze hypotheses to be proved

by such experimentation. These technological possibilities may spur the development of such a 'systems science' discipline; current work in the mathematical analysis of clustering among recorded items may provide the germ for its emergence. (Author)

AD-630 985 See Fld. 5/7

5/3. ECONOMICS

AD-630 627 Fld. 5/3, 12/1
CFSTI Prices: HC $2.60 MF $0.50
STANFORD UNIV CALIF INST FOR MATHEMATICAL STUDIES IN THE SOCIAL SCIENCES
QUASI-EQUILIBRIA IN MARKETS WITH NON-CONVEX PREFERENCES.
Technical rept.,
by Ross M. Starr. 28 Mar 66, 27p. Rept. no. TR-141,
Contract Nonr-225 (50), Proj. NR-047-004,
Unclassified report

Descriptors: (*Mathematical models, *Economics), Decision making, Bargaining, Game theory

An upper bound is placed on social divergence from general equilibrium, due to non-convexity of the traders' preference relations. Existence and significance of certain quasi-equilibria are investigated. If there is a sufficiently large number of traders in the market, the existence of a configuration arbitrarily close to equilibrium is demonstrated. (Author)

AD-630 643 Fld. 5/3
CFSTI Prices: HC $1.10 MF $0.50
RAND CORP SANTA MONICA CALIF
TARIFFS AND ECONOMIC DEVELOPMENT: A COMMENT,
by Leland L. Johnson. Mar 66, 8p. Rept. no. P-3335,
Unclassified report

Descriptors: (*Economics, Theory), Cost, Industrial production, Commerce

Comment on the article by Harry G. Johnson in the October 1964 issue of 'The Journal of Development Studies': 'Tariffs and economic development: some theoretical issues,' particularly regarding a supposed detrimental welfare effect of technical progress brought about by domestic substitutions within a country for formerly protected imports. The contention is made that while technical change may provide opportunities for new kinds of commodity substitutions, which at first may make the country worse off, the technical improvement subsequent to the successful substitution may have more than offsetting beneficial effects, especially after domestic costs have fallen enough for major previous imports so that their domestic price falls below the previously protected level. (Prepared for submission to 'The Journal of Development Studies')

AD-630 666 Fld. 5/3
CFSTI Prices: HC $2.00 MF $0.50
STANFORD UNIV CALIF INST FOR MATHEMATICAL STUDIES IN THE SOCIAL SCIENCES
ECONOMIC EQUILIBRIUM.
Technical rept.,
by Kenneth J. Arrow. 31 Mar 66, 35p. Rept. no. TR-142,
Contract Nonr-225 (50), Proj. NR-047-004,
Unclassified report

Descriptors: (*Economics, Theory), History, Stability, Costs, Commerce

A brief history of the concept of general economic equilibrium is presented, with special emphasis on the development of the field since 1932. This is followed by a fairly detailed survey of the present known results on the existence of competitive equilibrium and briefer surveys of other topics, specifically the optimality of competitive equilibrium, the concept of the core, uniqueness of competitive equilibrium, stability, comparative statics, and equilibrium over time. (Author) (Prepared for the 'International Encyclopedia of the Social Sciences')

AD-630 986 Fld. 5/3
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
RISK AND REQUIRED RETURN ON EQUITY,
by Fred D. Arditti. Mar 66, 37p. Rept. no. P-3336,
Unclassified report

Descriptors: (*Economics, Theory), (*Distribution (Economics), Probability), Mathematical models, Money, Analysis of variance, Statistical analysis

With the average dividend yield plus the average growth rate in earnings identified as the required return on equity, then from the statistical results presented the conclusion is that the second and third moments of the probability distribution are reasonable risk measures while the market correlation coefficient of returns is not. The regressions involving the dividend-earnings ratio show that it is negatively and significantly related to the required return. Investors like high dividend-payouts. The debt-equity ratio appeared in all regressions with a negative sign. The explanation is that some other risk variables which are positively correlated with the required return but negatively correlated with the debt-equity ratio have been omitted. Most of the information about any probability distribution is contained in its first three moments. It seems plausible to assume that all the information relating to income is included in the regressions. The omitted variables must relate to some nonincome information. With the same line of reasoning, that the first three moments contain all the income information, the argument is ruled out that the dividend -payout affects the stock price because it yields additional information about future earnings. There remain two possible explanations. The first is that the market 'irrationally' likes dividends. The second is that the net effect of brokerage fees, negates the argument that all investors can freely sell stock to augment the current dividend stream.

AD-631 130 Fld. 5/3, 12/2
CFSTI Prices: HC $2.00 MF $0.50
CASE INST OF TECH CLEVELAND OHIO OPERATIONS RESEARCH GROUP
AN OPERATIONAL THEORY OF OLIGOPOLY.
Technical memo.,
by Dilip K. Guha, and S. S. Sengupta. 1961, 33p. Rept. no. TM-17,
Contract Nonr-1141 (17)
Unclassified report

Research supported in part by Busch Foundation Grant.

Descriptors: (*Commerce, Theory), (*Economics, theory), Probability, Distribution (Economics), Optimization, Operations research, Costs, Mathematical models, Decision theory, Dynamic programming, Management planning

The work reported stems from an attempt to derive operationally meaningful propositions that may be useful to the management of a firm selling an undifferentiated product in conditions of oligopoly. It avoids the game-theoretic constructs on the one hand, and the notions of reaction functions and conjectural variations on the other; it only builds the minimum necessary frame work of concepts and constructs for the purposes of decision-making. Given the structure of competition (that is, who competes over what and with what means), the organization of the market (that is, the institutional setup for the consummation of a transaction), and the nature of information available to buyers and sellers, it is demonstrated that one can derive the probability distribution of demand. This demand is demand 'as seen from the viewpoint of the individual firm;' it is parametrized by the firm's own price-offerings. The distribution, so derived, is further refined so as to be applicable in the derivation of the optimal level and course of price-setting. The level is relevant for the short-run decisions, while the course is relevant to the long-run decisions stretching over more than one period. (Author)

5/4. HISTORY, LAW AND POLITICAL SCIENCE

AD-630 564 Fld. 5/4
CFSTI Prices: HC $4.00 MF $1.00
PITTSBURGH UNIV PA DEPT OF SOCIOLOGY
THE EFFECTS OF EVENTS: AN EXPLORATORY ANALYSIS OF CHANGE IN PROBABILITY AND DESIRABILITY EVALUATIONS OF COLD WAR FUTURES,
by Pat N. Lackey. Jan 66, 144p. Contract AF-AFOSR-259-64, Proj. AF-9779, Task 977902, AFOSR 66-0125
Unclassified report

Descriptors: (*Cold war, Probability), (*Political science, Cold war), Public opinion, Nuclear weapons, International law, USSR, United States Government, China, Africa, Eastern Europe, Western Europe, Government (Foreign), Foreign policy, Foreign aid, Vietnam

In this exploratory study of the impact of 53 hypothetical events on the likelihood and desirability of ten Cold War Futures, interviews with 40 undergraduate students yielding data on the importance of issues in changing the world situation; judgements about past, present and future levels of international tension; evaluations of the probability and desirability of ten Cold War Futures, and effects of events on initial probability and desirability evaluations. Objectives were to classify events according to the way they affect evaluations of the Futures and to analyze the changes they bring about in evaluations of probability and desirability, as well as to further the methodology of Anticipations Theory. Results indicate the following issues are most important: increase in the number of nations with nuclear arms, disagreement among members of the eastern and western blocks. Events most critical for changing probability are: the United States discontinues foreign aid to countries with unstable governments, there is a major economic depression in the Soviet Union, the United States withdraws from Sough Viet Nam. Events which cause the most change in desirability are: Communist China develops a nuclear armed force, the independent nations of Africa develop a military force for their mutual defense. (Author)

AD-630 939 Fld. 5/4
CFSTI Prices: HC $3.00 MF $0.75
SPACE AND INFORMATION SYSTEMS DIV NORTH AMERICAN AVIATION INC DOWNEY CALIF
FACTORS OPERATIVE IN A POST-ARMS CONTROL SITUATION, VOLUME I.
Final summary rept.,
by R. E. Brown. 14 Aug 65, 90p. Rept. no. SID-65-1021-1-Vol-1,
Contract AF 49 (638)-1411,
Unclassified report

See also AD-630 940.

Descriptors: (*Arms control, Analysis), (*Armament, Analysis), National defense, United States Government, USSR, Military strategy, Military facilities, History, Latin America, Nuclear weapons, Economic warfare, Deterrence

Arms control is seen to be different from disarmament. The objectives of arms control are not necessarily different from those of the military, and some arms control measures may be desirable strategic options which tend to increase the national security. Various arms control and disarmament proposals are examined, and the effects of each on military capability to preserve the national security and protect vital national interests are analyzed. The following proposals are examined: U. S. and USSR proposals for GCD (general and complete disarmament) military missions and observation posts; the Johnson 'Five-Point Program' including the verified freeze; closure of overseas bases; and nuclear free zones. Implications of these and other arms control proposals on the Zuckert-Page Ten Military Policy goals and the following national security problem areas are analyzed: deterrence of attack on the U. S. by major powers; deterrence of attack on the U. S. by minor powers; security of interests in Latin America; subversion and economic warfare; and open or clandestine rearmament. (Author)

AD-630 940 Fld. 5/4
CFSTI Prices: HC $6.00 MF $1.25
SPACE AND INFORMATION SYSTEMS DIV NORTH AMERICAN AVIATION INC DOWNEY CALIF
FACTORS OPERATIVE IN A POST-ARMS CONTROL SITUATION, VOLUME II.
Final technical rept.,
by R. E. Brown. 14 Aug 65, 219p. Rept. no. SID-65-1021-2-Vol-2,
Contract AF 49 (638)-1411,
Unclassified report

See also AD-630 939.

Descriptors: (*Arms control, Analysis), (*Armament, Analysis), National defense, United States Government, USSR, Military strategy, Military facilities, History, Latin America, Nuclear weapons, Economics warfare, Deterrence

Section I contains a series of position papers on subjects relevent to the study. Section II report contains documentary material relevent to the proposals examined in the study. Drafts of proposals, and explanatory of clarifying statements by various public officials, are presented. A detailed Chronology of Events relating to arms control, was prepared for the years 1945-1964 and is presented in Section III. Section IV contains the study bibliography.

5/5. HUMAN FACTORS ENGINEERING

AD-630 638 Fld. 5/5, 5/8
CFSTI Prices: HC $3.00 MF $0.75
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
BASIC HUMAN FACTORS TASK DATA RELATIONSHIPS IN AEROSPACE SYSTEM DESIGN AND DEVELOPMENT.
Final rept., Aug-Dec 65,
by Duncan L. Hannah, and Lawrence E. Reed. Dec 65, 61p. Rept. no. AMRL-TR-231,
Proj. AF-1710, Task 171006,
Unclassified report

Prepared in cooperation with American Institutes for Research, Pittsburgh, Pa.

Descriptors: (*Human engineering, Management planning), (*Man-machine systems, Human engineering), (*Systems engineering, Flow charting), Astronautics, Air Force, Data, Networks, Classification, Job analysis, Specifications, Decision making, Personnel management, Training, Reliability, Maintainability, Performance (Human), Learning, Feedback

The generation, use, and flow of human factors task data in aerospace system design and development are described. The data are characterized by a process of continual transformation in content and form of presentation occurring throughout the iterative cycles of system development. The networks within which data flow are shown to be extensive in size, pervasive in nature, and complex in their dynamic relationships. These dynamic processes are illustrated in flow diagrams showing the relationships of human factors task data and their input/output elements in functional analysis for planning, specifications, task analysis, human engineering, reliability, maintainability, qualitative and quantitative personnel requirements information, training equipment planning information, and maintenance manuals. (Author)

AD-631 023 Fld. 5/5
CFSTI Prices: HC $4.00 MF $0.75
HRB-SINGER INC STATE COLLEGE PA
GUIDEBOOK FOR THE COLLECTION OF HUMAN FACTORS DATA.
Final rept.,
by Louis B. Myers, Robert G. Carter, and Robert S. Hosteller. Jan 66, 122p. Rept. no. PTB-66-3,79211-F
Contract Nonr-4751 (00)
Unclassified report

Descriptors: (*Human engineering, Handbooks), Data, Systems engineering, Analysis, Maintenance, Personnel management, Time studies

The guidebook was developed primarily as a reference to aid the Project Officer in the assessment of human factors effects on system performance and in the isolation of the causal factors. There are three sections to this guidebook, each serving a different purpose. Section I provides the necessary background information and sets the perspective for the use of the techniques and materials presented in Section II. This section contains the tools and techniques for system evaluation. This includes methods for obtaining time, accuracy, and maintenance data as well as the techniques for analyzing and interpreting these data. Methods for obtaining qualitative data through questionnaires and checklists are also contained in this section, including sample questionnaires and checklists. The third section (Section III) contains a fairly detailed example of the application of the previously described techniques. Also included are rather complete lists of test objectives and criteria measures. (Author)

AD-630 639 **See Fld. 1/5**

AD-630 880 **See Fld. 5/8**

AD-630 881 **See Fld. 5/8**

AD-631 182 **See Fld. 5/8**

5/7. LINGUISTICS

AD-630 575 Fld. 5/7
HASKINS LABS NEW YORK
TYPING ERRORS AS CLUES TO SERIAL ORDERING MECHANISMS IN LANGUAGE BEHAVIOR,
by Peter F. MacNeilage. 1963, 17p. Contract PHS-DE-01774,
Unclassified report

Availability: Published in Language and Speech v7 pt3 p144-59 Jul-Sep 1964. Copies to DDC users only.

Descriptors: (*Language, Behavior), Errors, Motor reactions, English language, Typewriters

623 typing errors produced by 5 subjects in a free typing situation were classified into two main categories: (a) spatial errors, in which a letter adjacent on the keyboard to the correct letter was typed, and (b) temporal errors, or errors in the order in which the required letters were typed. Spatial errors were mostly associated with the left hand and keyboard difficulty, while temporal errors mostly arose from language structure variables. Results were incompatible with 'one stage' or 'chaining' theories of serial ordering. They suggested a hierarchical or 'three stage' output mechanism consisting of (a) a 'determining tendency', (b) a programming mechanism, reflected by temporal errors, and (c) a relatively separate executive mechanism, reflected by spatial errors. Some characteristics of the programming mechanism are discussed. (Author)

AD-630 985 Fld. 5/7, 5/2
CFSTI Prices: HC $3.00 MF $0.75
RAND CORP SANTA MONICA CALIF
COMPUTATIONAL LINGUISTICS: BIBLIOGRAPHY, 1965,
by David G. Hays, Bozena Henisz-Dostert, and Marjorie L. Rapp. Apr 66, 81p. Rept. no. RM-4986-PR,
Contract AF 49 (638)-700,
Unclassified report

Descriptors: (*Computational linguistics, *Bibliographies), (*Documentation, Bibliographies), Machine translation, Classification, Programming (Computers), Computers, Abstracts, Processing, Information retrieval, Subject indexing, Chinese language, English language, German language, Russian language

A bibliography citing 700 U.S. and foreign articles, reports, and books relevant to the fields of computational linguistics and documentation. A selective coverage of classification theory, computation and programming, computers and hardware, non-numerical applications of computers, and psycholinguistics is included. In the area of linguistics, the editors have taken a broad view of structural theory and semantics. (Author)

AD-630 521 **See Fld. 5/2**

AD-630 574 **See Fld. 17/2**

AD-630 576 **See Fld. 17/2**

5/8. MAN-MACHINE RELATIONS

AD-630 880 Fld. 5/8, 5/5
CFSTI Prices: HC $6.60 MF $0.75
MARTIN CO BALTIMORE MD
HUMAN OPERATOR CONTROL SYSTEMS: I. THE INTERACTION BETWEEN MODES OF INFORMATION DISPLAY AND CONTROL SYSTEM DYNAMICS WITH A SINE WAVE COURSE,
by R. W. Obermayer, W. F. Swartz, and F. A. Muckler. Sep 60, 64p. Rept. no. Engineering-11494,
Contract AF 33 (616)-5472, Proj. AF-6190,
Unclassified report

See also AD-630 881.

Descriptors: (*Man-machine systems, *Control systems), (*Human engineering, Control systems), (*Tracking, Human engineering), Display systems, Errors, Performance (Human), Analysis of variance, Statistical analysis, Targets, Time, Flight control systems

Nine skilled subjects performed a one-dimensional tracking task in which the forcing function was a sine wave course. The experimental conditions were formed from combinations of following and compensatory modes of information display with position, rate, and acceleration control system dynamics. Principle measures obtained were Average Absolute Error, Root Mean Square Error, and Time-on-Target. A significant interaction was found indicating that display modes and control system dynamics were functionally interdependent. It was determined that a description of the relation between display modes and control dynamics is not complete unless it is recognized that different trends in system performance are obtained for individual subjects. (Author)

AD-630 881 Fld. 5/8, 5/5
CFSTI Prices: HC $7.60 MF $0.75
MARTIN CO BALTIMORE MD
HUMAN OPERATOR CONTROLS SYSTEMS: II. THE INTERACTION OF DISPLAY MODE, CONTROL SYSTEM DYNAMICS AND COURSE FREQUENCY.
by R. W. Obermayer, W. F. Swartz, and F. A. Muckler. Dec 60, 78p. Rept. no. Engineering-11494-2,
Contract AF 33 (616)-5472,
Unclassified report

See also AD-630 880.

Descriptors: (*Man-machine systems, *Control systems), (*Human engineering, Control systems), (*Tracking, Human engineering), Display systems, Errors, Performance (Human), Analysis of variance, Statistical analysis, Targets, Time, Flight control systems

The experiment studied the interaction of the parameters of mode of information display, control system dynamics and course frequency in a man-machine system where the human operator exerted closed-loop control in one-dimension. The experimental conditions were formed from all possible combinations of following and compensatory display, three complex courses of different frequencies; and position, rate and acceleration control dynamics. A significant three-factor interaction was found between display mode, course frequency and control system dynamics. (Author)

AD-631 182 Fld. 5/8, 5/5, 22/2, 9/2
CFSTI Prices: HC $5.00 MF $1.00
COMPUTER CONCEPTS INC LOS ANGELES CALIF
THE ROLE OF COMPUTERS IN HANDLING AEROSPACE SYSTEMS HUMAN FACTORS TASK DATA.
Final rept. 3 Jun 64-3 Jun 65,
by Irvin R. Whiteman. Dec 65, 183p. Contract AF 33 (615)-1557, Proj. AF-1710, Task 171006, AMRL TR-65-206
Unclassified report

See also AD-621 379.

Descriptors: (*Data processing systems, Human engineering), (*Human engineering, Weapon systems), (*Space flight, Systems engineering), (*Air Force, Systems engineering), Management engineering, Personnel management, Decision making, Automation, Information retrieval, Supervisory personnel, Computers, Data storage systems, Performance (Human), Ground support equipment

The characteristics of a computer based data system for handling human factors task information generated in support of advanced system development are described. On the basis of information gathered from users and generators of data at representative Government and contractor installations, the current and potential uses of computers were assessed to determine the desirable characteristics for a computerized human factors task data handling system. The proposed data handling system will assist the human factors specialist and system design engineers in the design and development of systems by providing them with means for: (1) drawing them closer to the data through a user-oriented system, (2) comparing data generated throughout the life-cycle of an advanced system and across systems, (3) analyzing data and conducting man-machine simulations, and (4) insuring that data are made available on a selective query and a timely basis. These objectives are met within the framework of a data system concept referred to as CENTRAL. The functions of CENTRAL are: (1) data storage and retrieval, (2) data processing, (3) computer program maintenance, and (4) system operational manual maintenance. (Author)

AD-630 638 **See Fld. 5/5**

5/9. PERSONNEL SELECTION, TRAINING AND EVALUATION

AD-630 601 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
AN EXPERIMENTAL EVALUATION OF METHODS FOR IMPROVING THE READING SKILLS OF STUDENTS AT A NESEP PREPARATORY SCHOOL.
Research rept.,
by E. A. Hooprich, and E. H. Anderson. Mar 66, 15p. Rept. no. SRR-66-16,
Proj. PF017030310,
Unclassified report

Descriptors: (*Reading, Training devices), Naval personnel, Training, Teaching methods, Reading machines, Performance tests, Analysis of variance

An evaluation was made of the relative effectiveness of several reading training methods differing in number or type of reading devices and time of training. Comparisons were made among five matched groups (four training groups and a control group) each composed of 12 NESEP Preparatory School summer students. Pre- and post-training test performance comparisons showed significant increases in speed of comprehension for three of the four training groups. No significant differences in the amount of speed of comprehension gain were atributable to use of reading machines or scheduled time of training sessions. None of the experimental groups made significant gains in level of comprehension. A change in post-training test orientation, emphasizing speed, significantly increased reading speed and decreased reading comprehension test performance. (Author)

AD-630 604 Fld. 5/9
CFSTI Prices: HC $12.60 MF $1.00
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
COURSE DESIGN MANUAL FOR JOB TRAINING COURSES (A PRELIMINARY EDITION).
Research rept.,
by Edward A. Rundquist. Mar 66, 127p. Rept. no. SRR-66-17,
Proj. PF017030201,
Unclassified report

Descriptors: (*Naval training, Instruction manuals), (*Instruction manuals, Preparation), (*Job analysis, Combat Information Centers), Training devices, Teaching methods, Learning, Effectiveness, Naval personnel, Performance (Human), Military requirements

The report is a preliminary edition of a manual designed to assist instructors in developing and improving job -related training courses. The course design process is explicated in nine operational steps. Suggestions are developed for accomplishing each step. Material from actual course design is used to illustrate the steps. (Author)

AD-630 626 Fld. 5/9
CFSTI Prices: HC $5.60 MF $0.75
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
TRAINING, UTILIZATION, AND PROFICIENCY OF MISSILE TECHNICIANS.
Technical bulletin,
by Chester R. Bilinski, and Lloyd S. Standlee. Mar 66, 56p. Rept. no. STB-66-26,
Proj. PF017030302,
Unclassified report

Descriptors: (*Guided missile personnel, Training), (*Naval training, Guided missile personnel), Technicians, Naval personnel, Submarines, Guided missiles (Underwater-to-surface), Guided missiles (Surface-to-surface), Performance tests, Achievement tests, Aptitude tests, Maintenance, Test equipment (Electronics), Performance (Human), Education, Mathematics

A survey was made of 146 Missile Technicians (MT's) who were assigned to activities and ships in the western United states and Pacific. The data should be relevant to the new rating, FTM--Fire Control Technicians (Missile), as well as to MT's now assigned to only Polaris equipped submarines. The data were gathered by means of records searches, written and performance tests, rating scales, and work check lists and diaries. The MT's were found to be working on a wide variety of tasks, several outside their rating. Some areas of weakness were found in mathematics, in electronics fundamentals, in the use of test equipment, and in tasks not frequently performed. In general, though, the MT's were performing their common maintenance duties at a satisfactory level of proficiency. (Author)

AD-630 911 Fld. 5/9, 5/10
CFSTI Prices: HC $2.00 MF $0.50
PURDUE UNIV LAFAYETTE IND OCCUPATIONAL RESEARCH CENTER
THE IDENTIFICATION, MEASUREMENT AND FACTOR ANALYSES OF 'WORKER-ORIENTED' JOB VARIABLES.
Rept. no. 3,
by George G. Gordon, and Ernest J. McCormick. Jul 63, 50p. Contract Nonr-1100 (19)
Unclassified report

Descriptors: (*Industrial psychology, Job analysis), (*Job analysis, Factor analysis), Employment, Measurement, Identification, Psychometrics, Personnel, Applied psychology, Reliability, Performance (Human), Correlation techniques

The following conclusions were drawn from the results of the study: (1) Jobs can be viewed from a framework of the activities that the incumbent performs; yet this framework need not be so specific that it cannot be generalized across different jobs, occupations, industries or geographical areas. (2) The application of psychological scaling techniques to the measurement of job variables is quite fruitful, even in the light of the effort that must be expended in scale construction. In each reliability study, the average reliability of the scaled items was clearly superior to that of the other items. (3) The factor analyses of worker-oriented variables defined a number of dimensions which seemed to be both meaningful and potentially useful. It was especially encouraging to note relationships between the factors emerging from this study, and those found in other studies of worker traits or job requirements. (Author)

AD-630 915 Fld. 5/9
CFSTI Prices: HC $2.60 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
A NETWORK FLOW TECHNIQUE FOR OPTIMIZING PERSONNEL ON BOARD BY PAY GRADE.
Research rept.,
by Donald F. Hayter, and Richard D. Conner. Feb 66, 26p. Rept. no. SRR-66-12,
Proj. PF016010902,
Unclassified report

Descriptors: (*Personnel management, Programming (Computers)), (*Naval personnel, Optimization), Models (Simulations), Recruitment, Flow charting, Manpower studies, Mathematical prediction, Iterative methods

The report describes one of a series of computerized techniques developed by this Activity in a continuing research program to provide the Bureau of Naval Personnel with new and improved methods for carrying out its enlisted personnel planning functions. The technique is based upon

a network flow model uniquely designed for allocating present and future enlisted manpower resources within the limits of constraining factors in a manner that will meet manpower requirements as closely as possible. In short, it is a planning technique for optimally allocating personnel on board at all pay grades of a rating for the next five years. The model considers the present number of personnel on board at each pay grade of a rating and will attrite and advance them realistically in future time periods. The future allocation of personnel among pay grades is optimized for a five-year period relative to the pay grade requirements within the constraints of predicted personnel attrition, advancements, reductions in grade (demotions), and the nonpetty officer base. (Author)

AD-630 916 Fld. 5/9
CFSTI Prices: HC $1.00 MF $0.50
PERSONNEL RESEARCH LAB (6570TH) AEROSPACE MEDICAL DIV LACKLAND AFB TEX
PREDICTING FIRST YEAR ACHIEVEMENT OF AIR FORCE ACADEMY CADETS, CLASS OF 1966,
by Robert E. Miller. Dec 65, 25p. Rept. no. PRL-TR-65-21,
Proj. AF-7719, Task 771904,
Unclassified report

Descriptors: (*Air force personnel, Selection), Officer personnel, Psychometrics, Classification, Mathematical prediction, Motivation, Tests, Statistical analysis, Correlation techniques

Candidates for admission to each Air Force Academy class are required to demonstrate their qualifications on a battery of selection tests. Qualified candidates who enter the Academy are given a battery of experimental tests upon entry as part of a program for the development of officer selection and classification instruments. In the class of 1966, a subset of experimental instruments was moved into the field and given a trial under selection conditions. Another subset was administered to selectees prior to entry. All selection and experimental tests were validated against criteria which become available at the end of the fourth class (freshman) year. Criteria used were the Academic Standard Score, the Military Rating, the Extracurricular Activities Standard Score, the Composite Standard Score, and Early Motivational Elimination. It was found that the experimental battery contains tests valid for each criterion and that the selection battery contains tests valid for each criterion except Early Motivational Elimination. For every criterion except the Academic Standard Score, some set of experimental tests was found which added significantly to prediction from the selection battery alone. The best multiple validity coefficients for each criterion ranged from .33 for Early Motivational Elimination to .59 for the Academic Standard Score. The best multiple validity for the Military Rating was .48. Tests given to the classes of 1965 and 1966 had similar validities and distribution statistics in both classes. (Author)

AD-630 981 Fld. 5/9, 9/2
CFSTI Prices: HC $2.00 MF $0.50
NAVAL PERSONNEL RESEARCH ACTIVITY SAN DIEGO CALIF
EFFECTIVENESS OF PROGRAMMED INSTRUCTIONAL MATERIALS DESIGNED TO INTEGRATE LOWER-LEVEL SUPPORTING BEHAVIORS INTO HIGHER-LEVEL BEHAVIORS IN A LEARNING PROGRAM FOR COMPUTER FLOW CHART DESIGN.
Technical bulletin (Final),
by John D. Ford,Jr., and John K. Meyer. Feb 66, 39p. Rept. no. STB-66-24,
Proj. PF017030210,
Unclassified report

See also AD-616 880.

Descriptors: (*Programmed instruction, Flow charting), (*Flow charting, Teaching methods), (*Computers, Flow charting), (*Training, Programming (Computers)), Design, Aptitude tests, Behavior, Instruction manuals, Learning

The study sought to evaluate a preliminary version of a learning program designed to teach computer flow charting. A method suggested by Gagne was applied to the task of designing computer flow charts. Analysis began by identifying the supporting behaviors needed to perform the criterion task. It was impossible to obtain a complete hierarchical structure for the flow charting task. Instructional materials were developed for virtually all of the learning sets. These materials comprised the basic or control program. In the experimental program integrative instructional materials were added to the control program. Each trainee spent 15 hours on a program. Trainee flow charts were rated on three skills, (1) symbolic representation, (2) configural design, and (3) conceptual formulation. Moderate support for a hierarchical task structure is found for the skill area of symbolic representation. The remaining two areas seem to conform much less to a hierarchical organization. In addition to the data obtained by ratings, observation of trainees while they worked on flow chart design problems uncovered procedural or process behaviors which characterized the more successful trainees. (Author)

AD-631 069 Fld. 5/9
CFSTI Prices: HC $4.60 MF $0.50
HUMAN RESOURCES RESEARCH OFFICE GEORGE WASHINGTON UNIV ALEXANDRIA VA
THE DEVELOPMENT OF TRAINING PROGRAMS FOR FIRST ENLISTMENT PERSONNEL IN ELECTRONICS MAINTENANCE MOS'S. III. HOW TO DESIGN THE HANDBOOK MATERIALS.
Research memo.,
by Arthur J. Hoehn. Feb 60, 45p.
Unclassified report

See also AD-623 944.

Descriptors: (*Electronic technicians, Training), (*Training, Handbooks), Design, Maintenance personnel, Maintenance, Specifications

The report presents concepts and principles relating to handbook design, describes procedures for applying the principles, and provides illustrative materials based on MOS 294 (Field Carrier Equipment Repairman).

AD-631 138 Fld. 5/9, 5/10
CFSTI Prices: HC $1.60 MF $0.50
WEST TEXAS STATE UNIV CANYON
SOME INTERACTIONS BETWEEN INDIVIDUAL DIFFERENCES AND MODES OF INSTRUCTION.
Final rept., Jan 64-Mar 65,
by Wilma Jo Bush, Dolores K. Gregg, Edgar A. Smith, and Coit B. McBride. Dec 65, 20p. Contract AF 33 (615)-1460, Proj. AF-1710, Task 171007,
AMRL TR-65-228
Unclassified report

Descriptors: (*Teaching methods, Humans), Students, Learning, Psychometrics, Achievement tests, Intelligence tests, Performance tests, Aptitude tests, Reading, Vocabulary, Mathematics, Verbal behavior, Training devices, Teaching machines, Programmed instruction, Statistical analysis, Correlation techniques

This study explored the hypothesis that there is a relationship between patterns of learning ability and the amount learned in different instructional conditions. Scores for each of 44 subjects were obtained on (a) the Reading Vocabulary and the Mathematics Fundamentals subtests of the California Achievement Test, (b) the Administrative and the Mechanical Scales from the Airman Qualifying Examination, and (c) the Verbal and Performance Scales of the Wechsler Adult Intelligence Scale. Each of the 44 subjects also learned in five different training situations. Differences between scores on associated subtests (e.g., Reading Vocabulary minus Mathematics Fundamentals) were correlated with the difference between gain scores obtained in the various learning situations. A significant relationship was observed between the difference on the subtests of the California Achievement Test and the difference between the gain score from lecture-like instruction and the gain score in laboratory-like instruction. The data tended to support the hypothesis that students with relative strength in Reading Vocabulary are superior to students with relative strength in Mathematics Fundamentals when both are required to learn from instructional conditions that are highly verbal. On the other hand, students exhibiting relative strength in Mathematics Fundamentals tend to learn more efficiently in individual laboratory situations than do students showing relative strength in Reading Vocabulary. (Author)

AD-631 178 Fld. 5/9, 14/5, 15/4
CFSTI Prices: HC $2.00 MF $0.50
ARMY PERSONNEL RESEARCH OFFICE WASHINGTON D C
ABILITY OF IMAGE INTERPRETERS TO ADAPT OUTPUT TO VARYING REQUIREMENTS FOR COMPLETENESS AND ACCURACY.
Technical research note,
by James A. Thomas, and Robert Sadacca. Dec 65, 29p. Rept. no. TRN-165,
Proj. DA-2J620901A721,
Unclassified report

Descriptors: (*Photointerpreters, Job analysis), (*Adjustment (Psychology), Photointerpreters), Computers, Decision making, Man-machine systems, Military intelligence, Performance (Human), Target recognition, Analysis of variance, Military requirements

Within the broad objectives of the Surveillance Systems research program, the Man Computer Functions Task is specifically concerned with the allocation of functions and interrelationships among interpreters and computers. The present publication describes an initial study, involving two experiments, in the development of procedures through which a computer can aid in the interpretation -decision process. The experiments were conducted to study the effect of providing payoff instructions based on specific intelligence requirements on image interpreter performance in two important tasks: (1) Location and identification of targets in tactical imagery and (2) Rapid screening of tactical imagery. Three sets of instructions were used in each experiment. One set emphasized importance of completeness of interpretation; another emphasized importance of achieving a balance between accuracy and completeness; the third emphasized accuracy over completeness. Results of both experiments showed that interpreters can vary their performance as a function of the relative weight given accuracy and completeness of output. Positive results obtained in both experiments point up the need for provision of guidance to interpreters to offset highly variable and subjective evaluations given intelligence requirements. Development of payoff matrices for classes of military situations is suggested. (Author)

AD-630 659 See Fld. 17/2

AD-630 941 See Fld. 17/2

AD-631 147 See Fld. 1/2

5/10. PSYCHOLOGY (INDIVIDUAL AND GROUP BEHAVIOR)

AD-630 607 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

THE INFLUENCE OF REPETITION RATE ON APPARENT MOVEMENT.
Physical sciences research papers,
by Floyd H. Cook, and John C. Mott-Smith. Feb 66, 18p. Rept. no. AFCRL-PSRP-194,AFCRL-66-86
Proj. AF-5628, Task 562803,

Unclassified report

Descriptors: (*Motion, Illusions), (*Illusions, Motion), (*Visual perception, Motion), Motion pictures, Images, Television display systems

If two similar visual forms displaced by some distance are presented in sequence for brief durations, the illusion of movement can occur. This phenomenon is important to motion pictures and television in particular, where it is used to convey the impression of motion to the viewer. The report describes an experimental attempt to determine the influence of repetition rate of the stimuli on the observation of the phenomenon. For the experiment, all factors were held constant except the spatial and temporal intervals between the two stimuli. The results clearly indicate that the repetition rate of the stimuli has a substantial effect on the perception of apparent movement. (Author)

AD-630 662 Fld. 5/10
CFSTI Prices: HC $3.60 MF $0.50
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS LAB OF AVIATION PSYCHOLOGY
INFERENCES ON THE BASIS OF CONDITIONALLY NONINDEPENDENT DATA.
Final rept.,
by David A. Schum. Dec 65, 38p. Contract AF 33 (657)-10763, Proj. AF-7184, Task 718403, AMRL TR-65-161

Unclassified report

Descriptors: (*Decision making, Mathematical prediction), Simulation, Tactical warfare, Information theory, Probability, Human engineering, Performance (Human), Theorems

The experiment was concerned with decision making in a tactical threat situation (simulated). More specifically, it was concerned with the ability of subjects to estimate the likelihood of hypotheses concerning the 'adversary's' intentions being true. The data, presented to the subjects concerning the enemy, were internally interrelated in a probabilistic sense. The purpose of the study was to evaluate the subjects' ability to exploit these interrelationships in making their estimates concerning the probable intentions of the enemy. The subjects' likelihood estimates as to the enemy's intent were compared with those computed using Bayes' theorem--a mathematical technique that, theoretically, makes maximum use of the data, their interrelationships and their relation to the hypotheses. In general, the estimates made by well-trained subjects agreed closely with those calculated from Bayes' theorem. The subjects apparently were able to exploit the probabilistic interrelationships in the data. Furthermore, the subjects' estimates reflected neither the conservatism nor the 'recklessness' suggested by other previous experiments. (Author)

AD-630 793 Fld. 5/10, 5/11
CFSTI Prices: HC $5.60 MF $0.50
BUREAU OF SOCIAL SCIENCE RESEARCH INC WASHINGTON D C
WORSHIP AND THE DANGEROUS LIFE: A STUDY OF CHURCH ATTENDANCE AMONG SPORT PARACHUTISTS.
Technical rept., 1963-1965,
by Samuel Z. Klausner. Dec 65, 55p. Contract AF 49 (638)-1510, Proj. AF-9779, Task 977901, AFOSR 66-0124

Unclassified report

Descriptors: (*Religion, Psychology), (*Parachute jumping, Religion), Recreation, Emotions, Fear, Motivation, Behavior, Anxiety, Attitudes, Personality, Projective techniques, Reaction (Psychology), Analysis of variance, Statistical analysis, Social sciences

The data for this study were drawn from 825 questionnaires returned by members of American sport parachuting clubs. Among Protestant parachutists, the emotionally volatile are more frequent church attenders than the relatively calm. Among Catholics the reverse is true; the calmer types go to church while the more volatile tend to stay away. Skydivers who avoid thinking about their fear of jumping are, especially among Protestants, more frequent church attenders than those skydivers who express their fear. Catholics who express the feeling of free fall in sensory and esthetic terms are more frequent church attenders than the Catholics who confront this experience in a simple, descriptive, matter-of-fact way. Protestants who grasp the free fall experience in a matter-of-fact way were more frequent worshippers in their churches than those Protestants for whom free fall is an esthetic or sensory experience. Protestants who felt that harm befalling a skydiver was due to fate--that is, predestined or determined, rather than a result of the jumper's irresponsible behavior, are more frequent church attenders. Catholics for whom skydiver injury is due to his own responsibility are more likely than fatalisti Catholics to be frequent attenders at Mass. (Author)

AD-630 842 Fld. 5/10
NAVAL MEDICAL RESEARCH INST BETHESDA MD
THE CONTAGION OF AGGRESSION.
Medical interim research rept.,
by Ladd Wheeler, and Anthony R. Caggiula. 12 May 65, 12p.
NAVMED MR005.12-2005-1 ,NAVMED MF-022.01.03-1002-10

Unclassified report

Availability: Published in Journal of Experimental Social Psychology v2 n1 p1-10 Feb 1966. Copies to DDC users only.

Descriptors: (*Social psychology, *Behavior), Group dynamics, Attitudes, Motivation, Anxiety, Verbal behavior, Reaction (Psychology), Inhibition

The following hypotheses were confirmed: (1) If a subject is instigated to aggression and observes an aggressive model, the amount of yielding by the target of aggression will not affect the subject's aggression. (2) Instigation to aggression (a) combined with observation of an aggressive model (b) will produce a greater frequency of aggression by a subject than a simple additive model of the effects of (a) and (b) would predict. The hypotheses were tested in a 6-condition experiment (N = 191) in which the model and the target were standard stimulus tapes. Instigation to aggression was created by the target's socially deviant opinions. Hypotheses were derived from a behavioral contagion framework, utilizing restraint reduction as the central concept. (Author)

AD-630 951 Fld. 5/10
CFSTI Prices: HC $1.00 MF $0.50
DUKE UNIV DURHAM N C
PLANNED AND INTRINSIC VARIABLES IN THE SOCIAL PSYCHOLOGICAL EXPERIMENT.
Technical rept.,
by Kurt W. Back, Stephen R. Wilson, Morton D.Bogdonoff, and William G. Troyer. 1966, 25p. Rept. no. TR-20,
Contract Nonr-1181 (11),NIH-M-5356 Proj. NR-177-470,

Unclassified report

Descriptors: (*Social psychology, Psychometrics), (*Psychometrics, Stress (Psychology)), Group dynamics, Reaction (Psychology), Psychophysiology, Fatty acids, Autonomic nervous system, Personality, Performance (Human)

The study was designed to investigate, with the aid of physiological measurements, the subject's reaction in a standard experiment. The following questions were investigated: (1) Do activities incidental to the experimental process, such as the order in which the subjects are tested and the conditions of waiting, affect the subjects; (2) Does the introduction of experimental variables arouse the subject separately from, and in addition to, the experimental arousal itself; (3) Do individual conditions, such as personality traits and previous experience, make a difference in the importance of intrinsic factors; (4) Do these differences in arousal affect the results of the experiment.

AD-630 965 Fld. 5/10, 5/11
MICHIGAN UNIV ANN ARBOR
CONCERN WITH MASTERY AND OCCUPATIONAL ATTRACTION,
by Paul G. Liberty Jr., Eugene Burnstein, and Robert W. Moulton. 26 Apr 65, 14p. Contract NSF-GS-570, Proj. AF-7719, Task 771902,

Unclassified report

Prepared in cooperation with California Univ., Berkeley and Personnel Research Lab, Lackland AFB, Tex.

Availability: Published in Journal of Personality v34 n1 p105-17 Mar 1966. Copies to DDC users only.

Descriptors: (*Motivation, Psychometrics), (*Employment, Motivation), Personality, Social psychology, Performance (Human)

The study compares prestige and competence as determinants of occupational attraction for individuals who differ in (1) the degree of importance they attach to being able to demonstrate competence, autonomy, and mastery (mastery concern) and (2) their conscious valuations of achievement and success. Mastery concern was measured by the Strodtbeck value-achievement scale, and the deCharms value-achievement scale was used to measure a person's direct, conscious achievement valuation. Approximately 160 college men rated 17 occupations on the degree of prestige (social standing) associated with each and the degree of competence (i.e., specialized training, ability, knowledge, and skill) each requires. Two sets of occupations were formed, one set composed of occupations with high prestige relative to competence and the other of occupations higher in competence than prestige. Various analyses performed on the occupational attraction, or preference, ratings of individuals indicated that attraction to the two sets of occupations was a function of "mastery" scores only. The preference for high prestige occupations by individuals low in mastery was seen as confirming the oft-postulated relationship between status concern and the absence of a fundamental sense of personal control. (Author)

AD-630 645 See Fld. 6/16

AD-630 646 See Fld. 6/16

AD-630 911 See Fld. 5/9

AD-631 019 See Fld. 5/11

AD-631 020 See Fld. 5/11

AD-631 049 See Fld. 5/11

AD-631 138 See Fld. 5/9

5/11. SOCIOLOGY

AD-631 019 Fld. 5/11, 5/10
CFSTI Prices: HC $2.00 MF $0.50
BUREAU OF SOCIAL SCIENCE RESEARCH INC WASHINGTON D C
THE IMPACT OF THE MEANS OF RECRUITMENT ON PERFORMANCE IN A DANGEROUS SPORT: SOCIAL, ENTHUSIASTIC AND EXHIBITIONIST SKYDIVERS.

Technical rept., 1963-1966,
by Samuel Z. Klausner. Jan 66, 32p. Contract AF 49 (638)-1510, Proj. AF-9779, Task 977901, AFOSR 66-0122

Unclassified report

Descriptors: (*Parachute jumping, Motivation), Social communication, Reading, Television communication systems, Recreation, Attitudes, Decision making, Personality, Psychometrics, Anxiety, Social sciences

Many skydivers are recruited by friends; relatively few are recruited through the mass media. Written materials are likely to attract older and more educated individuals to the sport. Individuals recruited by their friends tend to place the social group ahead of the sport and may shift to another sport rather than change their group when faced with a choice. Those who are recruited through written materials tend to be more active and enthusiastic skydivers. Those recruited through television are more interested in the exhibitionistic aspects of skydiving and, in their personalities, tend to be more passive. Those recruited by friends are more likely to be 'locals', concerned with the activity of their immediate skydiving group, while those recruited through the mass media are more likely to be 'cosmopolitans', concerned with national aspects of skydiving. (Author)

AD-631 020 Fld. 5/11, 5/10
CFSTI Prices: HC $2.00 MF $0.50
BUREAU OF SOCIAL SCIENCE RESEARCH INC WASHINGTON D C
THE TRANSFORMATION OF FEAR.
Technical rept., 1963-1966,
by Samuel Z. Klausner. Jan 66, 41p. Contract AF 49 (638)-1510, Proj. AF-9779, Task 977901, AFOSR 66-0123

Unclassified report

Descriptors: (*Parachute jumping, Fear), Anxiety, Motivation, Emotions, Stress (Psychology), Behavior, Attitudes, Personality, Psychometrics, Recreation, Correlation techniques, Social sciences

Hypothesis: (1) Fear and enthusiasm are negatively correlated components of affectual excitement. (2) In acting despite fear, fear is transformed into enthusiasm (the affectual valence shift from negative to positive); i.e., fear at one point is positively correlated with enthusiasm at a later point in the act. A sample of 825 American sport parachutists indicated the degrees of fear and enthusiasm experienced during their first jump. The data were examined by regression analysis of the fear and enthusiasm scores. During the jump preparation both fear and enthusiasm increase. At the start of the jump run, fear decreases and enthusiasm increases. A nadir and zenith, respectively, are reached when the parachute is opened. Fear again increases and enthusiasm decreases near landing. Upon touching the ground, fear drops to a new nadir and enthusiasm rises to a zenith above the first. The mean scores for fear and for enthusiasm at successive points during the jump are negatively correlated. At single points, individual fear and enthusiasm scores are also negatively correlated. These findings support the first hypothesis. The individual fear scores at the first zenith of fear are less negatively and then more positively correlated with individual enthusiasm at successive subsequent points; this finding supports the second hypothesis. A deviant case analysis showed that those who transform their fear into a relatively great amount of enthusiasm tend to be independent, energetic personalities, while those who fail, relatively, to transform the fear into enthusiasm tend to be passive, dependent personalities. (Author)

AD-631 049 Fld. 5/11, 5/10
CFSTI Prices: HC $2.00 MF $0.50
BUREAU OF SOCIAL SCIENCE RESEARCH INC WASHINGTON D C
VOLUNTEERS FOR A HIGH RISK SPORT.
Technical rept., 1963-1966,
by Samuel Z. Klausner. Jan 66, 49p. Contract AF 49 (638)-1510, Proj. AF-9779, Task 977901, AFOSR 66-0121

Unclassified report

Descriptors: (*Parachute jumping, Recreation), United States, Distribution, Attitudes, Public opinion, Newspapers, Anxiety, Motivation, Personality, Fear, Social sciences, Statistical data

Sport parachutists tend to be over-represented in the Western region of the United States. They are, by and large, relatively young males who look upon the sport as a masculine expression. The sport is objectively dangerous, as measured by the accident rate, and is subjectively perceived as such. Sport parachutists tend to be single-minded in their attitude to the sport, sometimes giving it priority over their commitment to family roles. Press reportage emphasizes the spectacular and exhibitionistic aspects of parachuting rather than its competitive sport aspects. Newspapers see the activity as exhibiting fun and 'guts' and as dangerous. (Author)

AD-630 793 **See Fld. 5/10**

AD-630 965 **See Fld. 5/10**

Field 6-BIOLOGICAL AND MEDICAL SCIENCES

6/1. BIOCHEMISTRY

AD-630 524 Fld. 6/1
CFSTI Prices: HC $1.10 MF $0.50
RIAS INC BALTIMORE MD
BASIC RESEARCH IN PHOTOSYNTHESIS.
Final rept., 1 Oct 60-31 Dec 65,
by Bessel Kok. 31 Dec 65, 9p. Contract AF 49 (638)-947, Proj. AF-9777, Task 37704, AFOSR 66-0602

Unclassified report

See also AD-619 135, AD-620 495.

Descriptors: (*Photosynthesis, Scientific research), Plants (Botany), Mass spectroscopy, Spectrum analyzers, Oxygen, Respiration, Oxidation-reduction reactions, Adenosine phosphates, Chloroplasts, Chlorophylls, Light, Metabolism, Reaction kinetics

Instrumentation and methodology were developed in the areas of mass spectrometry, sensitive spectroscopy, polarography (oxygen exchange), and techniques for irradiating photosynthetic materials with highintensity monochromatic light. Oxygen uptake could be decreased or enhanced during photosynthesis, depending on wavelength of illumination. Photosystem I was sensitized predominantly by long-wave illumination, with suppression of respiratory uptake. Photosystem II, with inducement of increased oxygen uptake key short-wave illumination, was not explained fully. A long-wave chlorophyll component (P700) was detected in the chloroplast which occurs in the low concentration of 1 per 100 total chlorophylls. In the primary event of photosystem I, P700, upon excitation must lose an electron to an associated reaction partner. In complete photosynthesis, the P700 is re-reduced by photosystem II. In a study with a mutant of Scenedesmus, the reducing power generated in photosystem II, simultaneaus with oxygen, was not lower than + 0.18 volts.

AD-630 957 Fld. 6/1
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
A SIMPLE METHOD FOR THE DETERMINATION OF WATER CONTENT AND PROTEIN CONCENTRATION IN SUBCELLULAR ELEMENTS,
by U. Glas, and G. F. Bahr. 2 Sep 65, 6p. Proj. DA-3A012504A818,

Unclassified report

Availability: Published in Journal of Histochemistry and Cytochemistry v14 n1 p40-4 1965. Copies to DDC users only.

Descriptors: (*Cytochemistry, Chemical analysis), (*Water, Cytochemistry), (*Proteins, Cytochemistry), (*Mitochondria, Chemical analysis), Nitrogen, Concentration (Chemistry), Cells (Biology), Separation

An accurate method for the determination of the average water content of subcellular particles from their suspensions is presented. The particle is freed from water by spinning it from its suspension medium into oil of high density. In the oil it is broken up, and the water is distilled off for its gravimetric determination in an absorption tube. The dry particle remnants are further centrifuged back into a watery medium in which the nitrogen content is determined. A protein content of 26.3% for the average rat liver mitochondrion is found. (Author)

AD-630 973 Fld. 6/1, 6/16, 8/4
CFSTI Prices: HC $7.30 MF $2.00
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
BROMINE IN THE ANIMAL ORGANISM AND THE MECHANISM OF ITS ACTION,
by I. N. Verkhovskaya. 4 Jan 66, 428p. Rept. no. FTD-TT-65-973, TT 66-60989

Unclassified report

Unedited rough draft trans. of mono. Brom v Zhivotnom Organizme i Mekhanizm ego Deistviya, Moscow, 1962 259p.

Descriptors: (*Bromine, Biochemistry), Geochemistry, Inorganic compounds, Sea water, Aquatic animals, Plants (Botany), Physiology, Conditioned reflex, Toxicity, Drugs, Germicides, Metabolism, Blood chemistry, Pituitary gland, Tissues (Biology), Mental disorders, Endocrine glands, Bromides, Chlorides, Chemotherapy, Mycobacterium tuberculosis, Diseases, Surgery, Epilepsy, Shock (Pathology), Hypertension, Ulcers, Pregnancy, Convulsive disorders, Poisoning, Salts, Strychnos alkaloids, Cerebrospinal fluid, Halogens, Quantitative analysis, Labeled substances, Animals, Excretion, Stomach, Central nervous system, Pharmacology, X rays, Neoplasms, Fatigue (Physiology), Thyroid gland, Absorption (Biological)

Contents: Properties of Bromine and Its Biogeochemistry: Comparison of Physical and Physico-Chemical Properties of Elements of the Seventh Group of the Mendeleyev System; Biogeochemistry of Bromine; Clinical and Physiological Aspects of Bromine: Use of Bromine in Clinical Practice and in Physiological Experiments; Bromine Intoxication; Critical examination of Zondek and Bier's Hypotheses on Bromine Metabolism in the Human Body; Clinical Use of Bromides in the Treatment of Certain Diseases; Experimental Data: Effect of Bromides on Some Physiological Processes in Vivo and on Isolated Organs; Amount of Bromine in the Animal Body; Distribution of Freshly Injected Bromides Labelled with Br82 the Animal Body and the Intensity of Bromine Metabolism in Various Organs and Tissues; Effect of the Functional State of the Central Nervous System on Bromide Metabolism in the Animal Body.

AD-631 036 Fld. 6/1
CFSTI Prices: HC $1.10 MF $0.50
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF STATISTICS
RECOMBINATION OF A POOL OF DNA FRAGMENTS WITH COMPLEMENTARY SINGLE-CHAIN ENDS.
Technical rept.,
by G. S. Watson, W. K. Smith, and C. A. Thomas. 1966, 10p. Rept. no. TR-47,

Contract Nonr-4010 (09),NSF-G-10726 Proj. NR-042-232,

Unclassified report

Descriptors: (*Bacteriophages, *Genetics), (*Desoxyribonucleic acids, Recombination reactions), Genes, Molecular properties, Enzymes, Nucleotides, Mathematical models

A model for Gentic Recombination in bacteriophage is presented. The DNA molecules in the pool are broken into fragments randomly, enzymes attack the 3'-ends of the fragments, the exposed bases seek complementary sequences on other fragments and new molecules are reassembled. Formulae are given for the ratio of output to input molecules and for the recombination rate and the length of the genetic map. (Author)

AD-631 145 Fld. 6/1, 6/5, 6/18
CFSTI Prices: HC $1.60 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
THE DNA CONTENT OF MITOTIC NUCLEI OF TWO MOUSE TUMORS,
by E. L. Alpen, and M. E. Johnston. 3 Mar 66, 18p. Rept. no. USNRDL-TR-986, NAVMED MR005.08-1200-9

Unclassified report

Descriptors: (*Desoxyribonucleic acids, *Neoplasms), Radiation effects, Cells (Biology), Nuclei (Biology), Leukemia, Biochemistry, Mice, Microphotometers, Spectrophotometers, Mitosis

A new high-precision microspectrophotometric method was used to test the validity of the 'DNA constancy hypothesis' in two mammalian tumor lines. The two are the mouse ascitic tumor BP-8 and the in vitro mouse leukemic cell line, L5178Y. It was shown that the mitotic nuclei of these cells have a DNA content with a coefficient of variation of 5-6%. The instrumental and measurement errors are 4-5%; thus the variability of DNA content as measured by absorption of Feulgen stain is 1% or less. (Author)

AD-630 938 **See Fld. 6/16**

6/3. BIOLOGY

AD-630 655 Fld. 6/3, 6/13
CFSTI Prices: HC $3.00 MF $0.75
SCHOOL OF AEROSPACE MEDICINE BROOKS AFB TEX
ENDOPARASITES OF LABORATORY ANIMALS.
Aeromedical Reviews,
by Robert R. Estes, and James C. Brown. Jan 66, 65p. Rept. no. Review-1-66, SAM-TR-66-1

Unclassified report

Descriptors: (*Parasites, Laboratory animals), (*Laboratory animals, Parasitic diseases), Primates, Dogs, Cats, Rodents, Rabbits, Chickens, Nematodes, Trematodes, Protozoa, Sporozoa, Eggs, Larvae, Diagnosis, Veterinary medicine

The review is a collection of illustrations of ova and larvae of most of the endoparasites affecting laboratory animals. Hosts include primates, canines, felines, rabbits, rodents, and poultry. It is intended as an aid in diagnosing parasitism in the laboratory animals most frequently used in today's research studies. (Author)

AD-630 707 Fld. 6/3, 6/19
CFSTI Prices: HC $2.00 MF $0.50
GEORGETOWN UNIV WASHINGTON D C DEPT OF BIOLOGY
PERFORMANCE OF SMALL MAMMALS AT LOW BODY TEMPERATURES.
Progress rept.,
by Joseph A. Panuska. 10 Apr 66, 27p. Contract DA-49-193-MD-2668,

Unclassified report

Descriptors: (*Mammals, Hypothermia), (*Body temperature, Behavior), (*Hypothermia, Behavior), Rats, Hamsters, Blood pressure, Pulse rate, Cannulation, Anesthesia, Motor reactions, Adaptation (Physiology), Stress (Physiology), Sulfoxides

The effect of low body temperature on trained performance was determined, and the causes of performance failure at critical body temperature levels were analyzed. The behavioral analysis included heat reinforcement and shock escape operant procedures. The critical body temperature for performance for the hypothermic rat was found to be 23 - 25C, several degrees C above the level of complete motor collapse. The hamster, a hibernator, showed greater variation in its hypothermic response and failed to perform at lower body temperatures than the rat. Physiological studies were begun on chronically cannulated unrestrained rats during progressive hypothermia and during rewarming. Blood pressures and heart rate were significantly different at certain corresponding temperature ranges during cooling and rewarming phases. Chronically cannulated but anesthetized control rats had consistently lower systolic and diastolic pressures and heart rates during the entire cooling process. A supplementary study on Dimethyl sulfoxide administered IP (3 or 6 g/kg in saline) revealed a significant temperature regulation disturbance at ambient temperatures of 1, 15 and 25C. Exposure of DMSO treated subjects to 1C resulted in deep hypothermia for all; at 15C one -third cooled to ambient temperature. At 25C, there was a body temperature depression of 3.6C. It appears, however, that the critical body temperature for performance was not affected by these doses of DMSO. (Author)

AD-630 708 Fld. 6/3, 12/1
CATHOLIC UNIV OF AMERICA WASHINGTON D C
STATISTICAL METHODS FOR THE ANALYSIS OF PROBLEMS IN ANIMAL ORIENTATION AND CERTAIN BIOLOGICAL RHYTHMS.
AIBS Monograph,
by Edward Batschelet. Jan 65, 63p. Contract Nonr-2249 (05),

Unclassified report

Copies available to DDC users only. Others may obtain copies from American Institute of Biological Sciences, 3900 Wisconsin Ave., Washington, D.C.

Descriptors: (*Rhythm (Biology), *Statistical analysis), Animals, Pigeons, Birds, Gastropoda, Periodic variations, Navigation

AD-630 729 Fld. 6/3
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
SOME CONTRIBUTIONS TO THE PROBLEM OF THE EPIDEMIC PROCESS. II. BASIC LAWS GOVERNING THE TRANSMISSION OF INFECTIOUS DISEASES BY PARASITIC ARTHROPODA. INSECTS AND TICKS. SUMMARY ONLY.
by N. R. Dyadichev. 1957, 2p. Rept. no. Trans-102,

Unclassified report

Journal of Microbiology, Epidemiology and Immunobiology v28 n2 p44-50, 1957.

Descriptors: (*Disease vectors, Arthropods), (*Arthropods, Infectious diseases), Parasites, Insects, Ticks, Siphonaptera, Lice, Epidemiology, Ecology, USSR

AD-630 730 Fld. 6/3
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
DATA ON EPIDEMIC PROCESSES. III. COMMUNICATION. EPIDEMIOLOGIC PECULIARITIES OF THE PLAGUE AND TULAREMIA CAUSED BY DIFFERENT WAYS OF INFECTION,
by N. R. Dyadichev. 1957, 2p. Rept. no. Trans-106,

Unclassified report

Journal Microbiology, Epidemiology and Immunobiology no. 3 p8-14 1957.

Descriptors: (*Disease vectors, Arthropods), (*Arthropods, Infectious diseases), Pasteurella, Diseases, Epidemiology, Ecology, Rodents, Ticks, Siphonaptera, USSR

The existence of all blood infections in nature, transmitted by blood sucking Arthropodes, and including plague and tularemia, is insured in each individual case by some determined specific vector, in the organism of which the agent of the respective disease lives for some time. Plague and tularemia, existing in nature as infectious diseases of rodents, very seldom differ one from another according to epizootology. These differences are stipulated mainly by the biological and ecological peculiarities of the specific vectors of the said infections in their natural (enzootic) centers, which, consequently, reflects on the epidemiology of these infections. The basic specific method of transmitting the agent of tularemia from the organism of one warm-blooded animal to another is by means of the tick, which determines the more important peculiarities of existence of the said infections in its natural center. This is also true of plague in its retention and transmission by fleas. (Document quoted in its entirety.)

AD-630 732 Fld. 6/3, 6/5
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
SOME PROBLEMS IN THE EPIDEMIOLOGY AND PARASITOLOGY OF VECTOR-BORNE OUTBREAKS OF TULAREMIA,
by V. N. Apekhtin. 1966, 3p. Rept. no. Trans-664,
TT 66-60924

Unclassified report

Trans. of an unidentified Russian article.

Descriptors: (*Pasteurella, Disease vectors), Epidemiology, Infectious diseases, Parasites, Bites + stings, Arthropods, USSR

AD-630 733 Fld. 6/3, 6/5
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
SOME QUESTIONS ON THE EPIDEMIOLOGY AND PARASITOLOGY OF VECTOR OUTBREAKS OF TULAREMIA,
by V. N. Apekhtins. 1966, 3p. Rept. no. Trans-665,
TT 66-60925

Unclassified report

Trans. of an unidentified Russian article.

Descriptors: (*Pasteurella, Disease vectors), Epidemiology, Infectious diseases, Parasites, Bites + stings, Arthropods, Rodents, USSR

AD-630 754 Fld. 6/3, 12/1
CFSTI Prices: HC $2.60 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
A DIALYSIS SYSTEM WITH ONE ABSORBING AND ONE SEMI-REFLECTING STATE.
Technical summary rept.,
by Marvin A. Kastenbaum. Feb 66, 22p. Rept. no. MRC-TSR-628,
Contract DA-11-022-ORD-2059,

Unclassified report

Descriptors: (*Probability, *Diffusion), Absorption, Reflection, Matrix algebra, Stochastic processes, Biometry

The random walk between an absorbing and a reflecting or semi-reflecting barrier has been dis-

cussed in the literature. Indeed, a biological example of such a random walk, arising from a system of countercurrent dialysis, was described by this author. In this earlier paper a technique was suggested for obtaining the probability of being in a specific state after a given number of transitions, if the probability is unity of being in the reflecting state at time zero. The present paper extends this technique to yield the full matrix of higher transition probabilities. (Author)

AD-630 787 Fld. 6/3, 6/15, 6/16
CFSTI Prices: HC $2.60 MF $0.50
OHIO STATE UNIV COLUMBUS DEPT OF MEDICINE
THE EFFECTS OF GANGLIONIC AND ADRENERGIC BLOCKADE ON THE CIRCULATION OF THE YOUNG CHIMPANZEE.
Final rept., 1 Oct 63-30 Apr 65,
by Clyde D. Schoenfeld, Arnold M. Weissler, Vernon L. Carter, and James V. Warren. Mar 66, 26p. Contract AF 29 (600)-4385, Proj. AF-6892, Task 689201,
ARL TR-66-7
Unclassified report

Descriptors: (*Autonomic nervous system, Chimpanzees), (*Sympatholytic agents, Blood circulation), (*Autonomic agents, Blood circulation), Ganglia, Pulse rate, Blood pressure, Stimulation, Atropine, Humans, Relaxation (Physiology), Tolerances (Physiology), Brain

The role of the autonomic nervous system in circulatory control in young chimpanzees was evaluated through the use of selected autonomic blocking agents. Ganglionic blockade resulted in decreases in cardiac output, heart rate and arterial pressure. Beta adrenergic blockade resulted in similar decreases in cardiac output and heart rate, while arterial pressure was unchanged. Alpha adrenergic blockge caused a decrease in arterial pressure and peripheral resistance. Heart rate rose and cardiac output showed no consistent change following alpha adrenergic blockade. (Author)

AD-630 883 Fld. 6/3
CFSTI Prices: HC $1.60 MF $0.50
NAVAL MEDICAL RESEARCH UNIT NO 2 TAIPEI (TAIWAN)
OBSERVATIONS ON THE BIONOMICS OF THE BITING MIDGE CULICOIDES ARAKAWAE (ARAKAWA) (DIPTERA: CERATOPOGONIDAE) IN TAIWAN,
by Wesley K. C. Sun. Feb 66, 14p. Rept. no. NAMU-2-TR-228,
NAVMED MR005.09-0057.2
Unclassified report

Descriptors: (*Diptera, Taiwan), Ecology, Distribution, Periodic variations, Climatology, Sex, Females, Disease vectors

Culicoides arakawae (Arakawa) is widely distributed in Taiwan and its adjoining islands: the Pescadores, Small Liu Chiu Island and Orchid Island, most abundantly at the plains from 200 m. elevation down to the sea coast. The yearly pattern of C. arakawae collected shows two eminences in spring and fall alternating with two depressions. The spring eminence is the dominant one. The nocturnal activity, sex ratio of the midge, and the fed/unfed index of the females are also reported. (Author)

AD-630 952 Fld. 6/3, 6/13, 6/5
LOBUND LAB UNIV OF NOTRE DAME IND
VIRAL STATUS OF 'GERMFREE' MICE,
by Morris Pollard. 1965, 6p.
Unclassified report

Availability: Published in National Cancer Institute Monograph no. 20, Viruses of Laboratory Rodents p167-72. Copies to DDC users only.

Descriptors: (*Germ-free animals, Virus diseases), (*Virus diseases, Germ-free animals), Viruses, Cancer, Neoplasms, Leukemia, Pathology, Antigen + antibodies, Tissue culture, Thymus, Excision, X rays, Electron microscopy, Mice, Rats

AD-631 018 Fld. 6/3
EMORY UNIV ATLANTA GA SCHOOL OF MEDICINE
CARDIAC OUTPUT IN HIBERNATING GROUND SQUIRRELS,
by Vojin Popovic. 16 Apr 64, 4p. Contract PHS-GM-09652,
Unclassified report

Availability: Published in The American Journal of Physiology v207 n6 p1345-8 1964. Copies to DDC users only.

Descriptors: (*Rodents, Hibernation), (*Hibernation, Cardiovascular system), Oxygen consumption, Hematocrit, Blood, Heart, Metabolism, Cannulation

After chronic cannulation of the aorta and right ventricle with polyethylene tubes, ground squirrels re-entered hibernation and were used for cardiac output determinations (ick principle). The cardiac output of a 210- to 220-g hibernating ground squirrel at a body temperature of 7 C was about 1.0 ml/min, about 65 times smaller than in the active state. A similar decrease occurred in the oxygen consumption of the hibernating animals. The arteriovenous difference of oxygen contents of the blood was unchanged in hibernation despite somewhat decreased oxygen content of arterial blood. The hematocrit ratio was 57 vol % in euthermic ground squirrels and only 40 in hibernating animals. (Author)

AD-631 022 Fld. 6/3
NAVAL MEDICAL RESEARCH UNIT NO 2 TAIPEI (TAIWAN)
EXPERIMENTAL INFECTION OF A MONGOOSE WITH ANGIOSTRONGYLUS CANTONENSIS (CHEN).
Technical rept.,
by Duell E. Wood. 1965, 5p. Rept. no. NAMRU-2-TR-230,
NAVMED MR005.09-0046.1
Unclassified report

Availability: Published in The Journal of Parasitology v51 n6 p941 Dec 1965. Copies to DDC users only.

Descriptors: (*Mammals, Parasites), Larvae, Eggs, Gastropoda, Worms, Ingestion (Physiology), Infections, Taiwan

A 'crab eating' mongoose, Herpestes urva, was fed 1000 Angiostrongylus cantonensis (Chen) larvae in the laboratory. The larvae were obtained from laboratory infected snails (Australorbis glabratus). Thirty-three days after the feeding, first stage larvae appeared in the stool of the mongoose. On autopsy 75 days after infection, 5 adult A. cantonensis were recovered from the heart and 100 or more dead worms were found in the pulmonary arteries. Large hardened masses in the lungs contained viable eggs and first stage larvae of A. cantonensis. (Author)

AD-630 574 See Fld. 17/2

AD-630 938 See Fld. 6/16

AD-630 977 See Fld. 6/16

AD-631 002 See Fld. 6/6

6/4. BIONICS

AD-630 590 See Fld. 20/6

6/5. CLINICAL MEDICINE

AD-630 582 Fld. 6/5
NAVAL MEDICAL RESEARCH INST BETHESDA MD
LOW-TEMPERATURE AFTERGLOW SPECTRUMS OF HUMAN CALCIFIED TISSUES,
by Kirk C. Hoerman, Sandra A. Mancewicz, and Aram Y. Balekjian. 13 Nov 64, 3p. Contract PHS-DE-01577-02,
NAVMED MR005.12-5000.2-12
Unclassified report

Availability: Published in Journal of Dental Research v45 n1 p216 Jan-Feb 1966. Copies to DDC users only.

Descriptors: (*Dentistry, *Ultraviolet radiation), (*Tissues (Biology), Luminescence), Calcification, Phosphorescence, Fluorescence, Spectrum analyzers, Reflectivity, Emissivity, Proteins, Bone, Teeth, Collagen, Tryptophan, Cryogenics

Luminescence of calcified tissue at 89K involved both singlet (fluorescence) and singlet-triplet intercombinations (phosphoresence). Modification of spectrophotofluorometers to accommodate solid specimens permitted spectral analysis of the reflectance emissivity from excited calcified tissue powders. Ultraviolet excitation was generally at 274 millimicrons. Enamel displayed an afterglow spectrum with apparent peaks at 412, 432, and 462 millimicrons. These emission maximums were characteristic of Class B proteins, that is, proteins whose emissivity is that of tryptophan even though this aromatic amino acid is present in disproportionately low concentration in polypeptide chain. Bone, dentin, and dentin collagen revealed one major emission peak (uncorrected) at about 418 millimicrons. Their emission curves and corrected maximums were not typical of any known globular proteins including those of Class A proteins, which have no tryptophan residues in their structure. Accordingly, one must look to either a new molecular luminescent center or an abnormal triplet state emission due to impurity activation sites as the emitting domain. (Author)

AD-630 731 Fld. 6/5
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
THE PROBLEM OF TULAREMIA IN CHILDREN,
by M. N. Rodov. 1966, 8p. Rept. no. Trans-223, TT 66-60923
Unclassified report

Trans. of Pediatriya (USSR) n8 p39-44 1957.

Descriptors: (*Pasteurella, Children), Diseases, Medicine, Disease vectors, Rats, Epidemiology, Diagnosis, Pathology, Streptomycins, Dosage, Allergy, Tests

Children of various ages become ill with tularemia. (A one year old child was observed.) A thorough vaccination program among children is necessary in those regions where tularemia is prevalent. Together with the seriously and medium grave forms of tularemia, ambulatory forms are encountered which can be diagnosed mainly on the basis of an allergic test with tularin. The clinical picture of the anginous-glandular form of tularemia in children has unique features that allow the correct establishment of a diagnosis in the first days of the disease, prior to the development of a positive biological test. Streptomycin is recommended as an effective preparation in the treatment of tularemia in children.

AD-630 734 Fld. 6/5, 6/13
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
SIMULTANEOUS VACCINATION BY THE EPICUTANEOUS METHOD AGAINST PLAGUE, BRUCELLOSIS AND TULAREMIA,
by B. R. Uzbekova, M. F. Shmuter, and G. A. Abdullina. 1966, 10p. Rept. no. Trans-745, TT 66-60926
Unclassified report

Trans. of Zdravookhranenie Kazakhstana (USSR) n7 p63-8 1962.

Descriptors: (*Pasteurella, Vaccines), (*Brucella, Vaccines), Immunity, Antigen-antibody reactions, Sensitivity, Allergy, Serodiagnosis, USSR

AD-630 735 Fld. 6/5, 6/13
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
REACTOGENICITY AND EFFECTIVENESS OF AEROGENIC VACCINATION AGAINST CERTAIN ZOONOSES,
by N. I. Aleksandrov, N. E. Gefen, N. S. Garin, K. G. Gapochko, and I. I. Daal-Berg. 1966, 9p.
Rept. no. Trans-796,
TT 66-60927

Unclassified report

Trans. of Voenno-Meditsinskii (USSR) n12 p51-9 1958.

Descriptors: (*Vaccines, Aerosols), (*Pasteurella, Vaccines), (*Brucella, Vaccines), (*Bacillus anthracis, Vaccines), Effectiveness, Immunity, Dosage, Laboratory animals, Humans, Serodiagnosis, Allergy, Test methods, Pathology, Medical examination, USSR

Dry aerogenic vaccines against plague, tularemia, brucellosis and anthrax are highly effective in acute experiments on experimental animals. Dry, aerogenic vaccines against plague, tularemia, brucellosis and anthrax when used in the proper dosages, are practically without reactions. Aerogenic immunization against brucellosis, tularemia and plague assures a definite immunological reorganization of the bodies of people, recordable with agglutination reactions (tularemia, brucellosis) opsono-phagocytic reactions (brucellosis), allergic tests (tularemia, brucellosis) and complement fixation reaction (plague). (Author)

AD-630 738 Fld. 6/5, 6/13
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
STUDY OF THE REACTION TO CHEMICALLY SORBED ANTHRAX VACCINE IN SMALL GROUPS OF PEOPLE,
by N. I. Alexsandrov, N. E. Gefen, A. P. Budak, V. F. Runova, and Yu. V. Ezepchuk. 1966, 6p.
Rept. no. trans-1395,
TT 66-60930

Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n3 p32-4 1963.

Descriptors: (*Bacillus anthracis, Vaccines), (*Vaccines, Effectiveness), (*Immunity, Bacillus anthracis), Humans, Dosage, Injection (Medicine), Hematology, Allergy, Antigen - antibody reactions, Epidemiology, USSR

Repository chemical sorbed anthrax vaccine given in doses of 10 and 7.5 mg proved to harmless and gave only mild postvaccinal reactions when injected subcutaneously to human beings. General and local reactions observed in the immunized individuals were mild and did not cause any loss of the working capacity. Changes in the blood picture (leukocytosis, accelerated erythrocyte sedimentation rate and rise of the segmentonuclear neutrophil count) and a marked positive test with anthraxin (anthrax allergen) noted almost in all the vaccinated individuals testifies to the presence of a specific, sufficiently marked immunization stimulation caused by the administration of repository chemical sorbed anthrax vaccine. (Author)

AD-630 892 Fld. 6/5
NAVAL MEDICAL RESEARCH UNIT NO 2 TAIPEI (TAIWAN) DEPT OF BIOCHEMISTRY
ABNORMAL HEMOGLOBIN CHARACTERISTICS OF TAIWAN ABORIGINES.
Technical rept.,
by R. Quentin Blackwell, Jeanette Tung-Hsiang Huangand , and Li-Chin Chien. Dec 65, 18p.
Rept. no. NAMRU-2-TR-229.
NAVMED MF022.03.07-2004-12

Unclassified report

Availability: Published in Human Biology v37 n4 p343-56 Dec 1965. Copies to DDC users only.

Descriptors: (*Hemoglobin, Blood diseases), (*Blood disorders, Taiwan), Anomalies, Anemias, Anthropology, Electrophoresis, Reviews

Blood samples from 4501 Taiwan aborigines were examined for abnormal hemoglobins by the Smithies vertical starch gel electrophoresis procedure at pH 9.0. Eight tribes were included in the study in the following numbers: Ami, 1571; Atayal, 354; Bunun, 684; Paiwan, 941; Puyuma, 329; Rukai, 129; Saisiat, 184; Tsou, 309. Only one type of anomalous hemoglobin, tentatively identified as Hemoglobin G Taiwan: Ami, was detected. Nine among the 1571 Ami subjects tested had this hemoglobin in addition to A. None of the remaining subjects had signs of abnormal hemoglobin. Studies were conducted among eight of the families of the 9 Ami subjects and additional family members bearing the anomalous hemoglobin were located. No obvious signs of anemia were detected in the families although detailed studies have not yet been made. The Taiwan aborigines are believed to be of Proto-Malayan stock and therefore related to other South East Asian groups. For this reason it was considered to be of particular anthropological interest that no hemoglobin E was detected among the present 4501 subjects because almost all other South East Asian groups tested have appreciable numbers of individuals with hemoglobin E. These results suggest that the hemoglobin E gene may have entered some of the South East Asian groups in comparatively recent times. (Author)

AD-630 958 Fld. 6/5
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
POLYPS OF THE VAGINA: A BENIGN LESION RESEMBLING SARCOMA BOTRYOIDES,
by Henry J. Norris, and Herbert B. Taylor. 21 May 65, 6p.

Unclassified report

Availability: Published in Cancer v19 n2 p227-32 Feb 1966. Copies to DDC users only.

Descriptors: (*Reproductive system, *Neoplasms), Females, Infants, Adults, Histology, Pathology, Diagnosis, Cancer, Hormones, Pregnancy, Birth, Biopsy, Excision

The clinical and pathologic study of 24 vaginal polyps, 22 from adults and 2 from infants, was prompted by the need for recognition of a benign polypoid vaginal lesion which must be distinguished from sarcoma botryoides, rhabdomyosarcoma and mixed mesodermal tumor. Twelve of the 22 polyps from adults contained atypical cells within the stroma. Five of these patients were pregnant when the polyp was discovered. Follow-up showed that the polyps are benign and adequately treated by local excision. The polyps from the 2 newborn infants were present at birth and were characterized by diffuse edema but contained no atypical stromal cells. One of the polyps regressed after biopsy. The other was locally excised and did not recur. Maternal hormones are thought to induce the intra-uterine development of the polyps in infants. The criteria for distinguishing vaginal polyps from sarcoma botryoides, rhabdomyosarcoma and mixed mesodermal tumor are discussed. (Author)

AD-630 967 Fld. 6/5, 8/7
ARMED FORCES INST OF PATHOLOGY WASHINGTON D C
A CRITICAL CONSIDERATION OF ROENTGENOLOGY AND MICROSCOPY IN PALAEOPATHOLOGY,
by Joe M. Blumberg, and Ellis R. Kerley. . 1964, 23p.

Unclassified report

Availability: Published in Human Palaeopathology p150-70 1966. Copies to DDC users only.

Descriptors: (*Bone, X rays), (*Paleontology, Pathology), Microscopy, Histological techniques, Diseases, Blood diseases, Hemopoietic system, Aging (Physiology), Growth, Cell division, Morphology (Biology), Anthropology, Archaeology

AD-630 999 Fld. 6/5
CFSTI Prices: HC $1.60 MF $0.50
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
THE INTERPRETATION OF AUDIOMETRIC FINDINGS WITHIN A HEARING CONSERVATION PROGRAM.
Special rept.,
by Vernon C. Bragg. 20 Dec 65, 15p. Rept. no. SR-65-8,
Proj. M7022.03.02-5006,

Unclassified report

Descriptors: (*Audiometry, Military medicine), Hearing, Test methods, Thresholds (Physiology), Audiofrequency, Diagnosis, Noise, Aviation personnel

A method for interpretation of audiometric data obtained within the Navy's Hearing Conservation Program is presented. An explanation of the various audiometric contours is given, followed by a step-by-step precedure for analyzing the pure tone audiogram. In addition, recommendations are made concerning the disposition of patients whose audiograms do not fall within normal limits. Utilization of these procedures within a comprehensive program of hearing testing, noise control, and education is recommended for all ships and stations whose personnel work in hazardous noise. (Author)

AD-631 142 Fld. 6/5, 6/16
CFSTI Prices: HC $2.60 MF $0.50
NAVAL MEDICAL FIELD RESEARCH LAB CAMP LEJEUNE N C
IMPROVEMENTS IN RECORDING HEART RATE DURING EXERCISE IN THE PERSPIRING SUBJECT.
Interim rept.,
by W. G. Holcomb. Feb 66, 21p. Rept. no. Vol. 16/No. 4,
NAVMED MF022.03.04-8002.4

Unclassified report

Descriptors: (*Pulse rate, Recording systems), (*Electrocardiography, Effectiveness), (*Electrodes, Medical equipment), (*Exercise, Pulse rate), Perspiration, Medical supplies, Adhesives, Humidity, Temperature

Electrodes manufactured by Naval Medical Field Research Laboratory (NMFRL) were compared with those manufactured by Beckman Instruments Company for the purpose of obtaining heart rates during vigorous activity (treadmill walking) under conditions of high temperature and humidity. Also, use of the Ace (R) bandage to secure the electrodes in place was compared with use of the Beckman adhesive fastener. The electrodes manufactured by NMFRL performed as well as did those manufactured by Beckman Instruments. The adhesive fastener presented advantages over the Ace (R) bandage, but a longitudinal study is required to determine whether its use over a period of time will result in dermatologic problems. The analog presentation of heart rate data presented several advantages over previous techniques. (Author)

AD-630 647 See Fld. 6/18

AD-630 724 See Fld. 6/13

AD-630 725 See Fld. 6/13

AD-630 726 See Fld. 6/10

AD-630 727 See Fld. 6/10

AD-630 728 See Fld. 6/15

AD-630 732 See Fld. 6/3

AD-630 733 See Fld. 6/3

AD-630 802 See Fld. 15/2

AD-630 952 See Fld. 6/3

AD-630 963 See Fld. 6/12

AD-631 051 See Fld. 12/1

AD-631 145 See Fld. 6/1

6/6. ENVIRONMENTAL BIOLOGY

AD-631 002 Fld. 6/6, 6/3
CFSTI Prices: HC $1.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
MECHANISM OF RODENTICIDAL ACTIVITY OF GLIRICIDIA SEPIUM.
Final technical rept., Jul 63-Dec 65,
by Harry Hochman. Apr 66, 20p. Rept. no. TR-R-439,
Proj. Y-R011-01-01-055,
Unclassified report

Descriptors: (*Rodenticides, Plants (Botany)), (*Coumarins, Rodenticides), Distillation, Phenols, Toxicity, Pathology, Rats

A study was made of the mechanism by which Gliricidia sepium (Yaite) exerts its rodenticidal properties. Extraction of the leaves of this plant, followed by physical and chemical fractionation, revealed the presence of coumarin as a constituent of the phenolic fraction. Consideration of the conditions under which these leaves are used as rodenticides, the known bacterial conversion of coumarin into the hemorrhagic agent dicoumerol, and pathological evidence in rats fed on incubated leaves point to coumarin as the basis for the rodenticidal properties of this plant. (Author)

AD-630 802 See Fld. 15/2

6/8. FOOD

AD-630 844 Fld. 6/8
CFSTI Prices: HC $3.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
DEHYDRATED FRUIT AND VEGETABLES,
by E. N. Volkov, and T. I. Pyatigorskaya. Feb 66, 32p. Rept. no. FSTC-HT-23-2-66,
Proj. 2301-6553,
TT 66-60949
Unclassified report

Trans. of an unidentified Russian article, pub. 1962 p7-21, 64-77.

Descriptors: (*Dehydrated foods, Quality control), (*Fruits, Dehydrated foods), (*Vegetables, Dehydrated foods), Processing, Packaging, Storage, Taste, Odors, Colors, Acceptability, Impurities, Moisture, Contamination, Pest control, Physical properties, Tests, USSR

An outline of the main steps in the technology of dehydration of fruits (apples, pears, apricots, peaches, plums, berries, grapes) and vegetables (potatoes, cabbage, beets, carrots, onions, greens) and ensuring their quality. The authors also discuss the packing and storing of dehydrated food products, methods of testing for quality, taste, appearance, and color, evaluation with respect to capacity for boiling to a pulp, reconstitution, and swelling, and methods or determining the presence of impurities and defects, moisture content, and pest infestation. (Author)

AD-630 846 Fld. 6/8, 7/3
CFSTI Prices: HC $1.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
THE PROBLEM OF FOOD SYNTHESIS,
by A. N. Nesmeianov. Jan 66, 20p. Rept. no. FSTC-HT-23-16-66,
Proj. 2301-6553,
TT 66-60951
Unclassified report

Trans. of Priroda (USSR) n9 p12-23 Sep 1965.

Descriptors: (*Food, Synthesis (Chemistry)), Proteins, Amino acids, Carbohydrates, Fats, Vitamins, Diet, Nutrition, Deficiency diseases, Starvation, Obesity, Taste, Odors, Organic compounds, USSR

Synthetic food will be an object of ever-increasing importance in the field of organic chemistry. Synthetic production of proteins (amino acids) is the most important because of worldwide deficiencies in this class of nutrients. The production of synthetic fats has already been solved while the cheapness of the natural carbohydrates makes this facet less important, though more difficult from an economic point of view. Problems of taste, odor, and consistency must also be dealt with. Present-day practices of enriching food with vitamins is related to, but not properly a part of, food synthesis. (Author)

AD-630 855 Fld. 6/8, 7/3
CFSTI Prices: HC $1.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
THE USE OF SOY-BEAN AND PEA FLOUR IN THE FERMENT METHOD FOR IMPROVING THE WHEAT BREAD QUALITY,
by L. Ya. Auerman, and R. D. Polandova. Mar 66, 11p. Rept. no. FSTC-HT-23-46-66,
Proj. 2301-6553,
TT 66-60960
Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Pishchevaya Tekhnologiya (USSR) n4 (47) p52-6 1965.

Descriptors: (*Bread, Preparation), (*Flour, Vegetables), Wheat, Acceptability, Oxidation, Oxidoreductases, Hydroperoxides, USSR

The baking properties of flour depend on the presence of unsaturated acid hydroperoxides, formed through the action of lipoxidase. The addition of a beaten mixture of soy-bean flour, oil, water, and wheat flour (liquid oxidizing phase, -- LOP) in dough making, produces a bread of higher volume, improved compressibility, and lighter color. Pea flour yields a similar but weaker effect. (Author)

6/9. HYGIENE AND SANITATION

AD-630 726 See Fld. 6/10

6/10. INDUSTRIAL (OCCUPATIONAL) MEDICINE

AD-630 726 Fld. 6/10, 6/5, 6/9
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
OCCUPATIONAL CASES OF TULAREMIA AND THEIR PREVENTION,
by Maisnikov Iua. 1966, 9p. Rept. no. Trans-44,
TT 66-60921
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n11 p91-4 1955.

Descriptors: (*Pasteurella, Diseases), (*Industrial medicine, Pasteurella), Food, Processing, Epidemiology, Rodents, Disease vectors, Contamination, Infections, Serodiagnosis, Public health, Sanitary engineering, USSR

AD-630 727 Fld. 6/10, 6/5
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
TO THE QUESTION OF THE DEGREE OF DISSEMINATION OF THE Q-FEVER AMONG THE WORKERS OF THE COTTON INDUSTRY,
by N. I. Fedorova, T. A. Bektemirov, I. V. Tarasevich, E. B. Kerbabaev, and L. L. Semashko. 1966, 7p. Rept. no. Trans-91,
TT 66-60922
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n11 p27-30 1956.

Descriptors: (*Coxiella, Diseases), (*Industrial medicine, Coxiella), (*Textile industry, Diseases), Cotton, Processing, Rickettsia, Infections, Disease vectors, Etiology, Serodiagnosis, Public health, Pigeons, Chickens, Mice, Guinea pigs, USSR

6/11. LIFE SUPPORT

AD-630 879 See Fld. 22/1

6/12. MEDICAL AND HOSPITAL EQUIPMENT AND SUPPLIES

AD-630 577 Fld. 6/12
HASKINS LABS NEW YORK
A MULTIPLE SUCTION ELECTRODE SYSTEM,
by Katherine S. Harris, Robert Rosov, Franklin S.Cooper, and Gloria F. Lysaught. 16 Mar 64, 4p. Contract PHS-DE-01774,
Unclassified report

Availability: Published in Electroencephalography and Clinical Neurophysiology v17 p698-700 1964. Copies to DDC users only.

Descriptors: (*Medical equipment, Electrodes), Design, Nervous system, Muscles, Physiology, Electronic recording systems, Electroencephalography

A suction electrode system is described with the following properties: (1) It can be adapted to a large number of leads. (2) The electrodes will adhere to skin or mucosa. (Author)

AD-630 963 Fld. 6/12, 6/5
MEDICAL COLL OF VIRGINIA RICHMOND
HOSPITAL ISOLATION SYSTEM FOR PREVENTING CROSS-CONTAMINATION BY STAPHYLOCOCCAL AND PSEUDOMONAS ORGANISMS IN BURN WOUNDS,
by B. W. Haynes Jr., and Miles E. Hench. 1965. 9p.
Unclassified report

Availability: Published in Annals of Surgery v162 n4 p641-9 Oct 1965. Copies to DDC users only.

Descriptors: (*Hospitals, *Medical equipment), (*Burns, Contamination), Staphylococcus aureus, Pseudomonas aeroginosa, Surgical techniques, Germicides, Wounds + injuries, Bacteria, Blood, Toxins + antitoxins, Gastrointestinal system

Experience with total hospital isolation, utilizing a specially designed isolator has been presented. A total of 149 patient days experience with patients having burn wound problems may be summarized as follows: (1) The isolator is an effective barrier against cross-contamination using hemoly-

tic Staphylococcus aureus, coagulase positive as the indicator organism. The device is workable and practical and permits the usual ward procedures without undue difficulty. (2) Utilizing this technic, the problem of self-infection in man may be studied effectively. Data presented suggest that the gastrointestinal tract is an important repository for Pseudomonas aeruginosa and demonstrate that it is possible to prevent Pseudomonas aeruginosa wound infection by intestinal antiseptis and total isolation. (Author)

AD-630 994 Fld. 6/12
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
APPARATUS FOR AUTOMATIC RECORDING OF THE ARTERIAL BLOOD PRESSURE,
by L. A. Kazaryan, and V. V. Lepeshkin. 21 Jan 66, 7p. Rept. no. FTD-TT-65-1579,
Unclassified report

Unedited rough draft trans. of Patent (USSR) 166 098, appl. 857493/31-16, 19 Sep 63.

Descriptors: (*Blood pressure, Recording systems), Measurement, Automatic, Pneumatic systems, Oscillographs, Medical equipment, Patents, USSR

An apparatus for the automatical recording of the arterial blood pressure is described. It consists of a pressure cuff which fastens to the shoulder of the test subject, a balloon with compressed air, and a miniature source of electric power supply. An automatic pressure device in the form of a spasmodic pneumatic switch is set in motion by means of a miniature sylphon with an electric contact in the transmitter circuit, accomplishing a periodic variation of air pressure in the pneumatic system for compressing the blood vessels. The apparatus is different in that the recording of the pulse oscillations is accomplished by means of a thermoanomometer transmitter, the output of which is switched onto a recording oscillograph.

AD-630 993 See Fld. 6/16

6/13. MICROBIOLOGY

AD-630 581 Fld. 6/13
NAVAL MEDICAL RESEARCH INST BETHESDA MD DEPT OF MICROBIOLOGY
MICROAGGLUTINATION TECHNIQUE FOR NEISSERIA MENINGITIDIS,
by Neylan A. Vedros, and Paul R. Hill. 1966, 5p. NAVMED MR005.09-1200.6-1
Unclassified report

Availability: Published in Journal of Bacteriology v91 n2 p900-1 Feb 1966. Copies to DDC users only.

Descriptors: (*Neisseria meningitidis, *Serodiagnosis), Antigen-antibody reaction, Immune serums, Rabbits, Test methods

A stable Neisseria meningitidis antigen was prepared using a tetrazolium compound which confers a red coloration to the microorganisms. With this antigen highly satisfactory microagglutination tests were performed with patient and rabbit hyperimmune sera. (Author)

AD-630 724 Fld. 6/13, 6/5
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
A TEST OF THE SUITABILITY OF DRY LIVE TULAREMIA VACCINE AND TULARIN FOR THE ERECTION OF A SKIN REACTION,
by N. A. Kazberyk, Z. I. Litvinova, P. N. Sadovnikova, and G. L. Pevsner. 1966, 6p. Rept. no. trans-36,
TT 66-60919
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n6 p58-61 1956.

Descriptors: (*Pasteurella, Vaccines), (*Vaccines, Immunity), (*Immunity, Test methods), Immunology, Diagnosis, Allergy, Antigen - antibody reactions, Viability, Skin, USSR

AD-630 725 Fld. 6/13, 6/5
CFSTI Prices: HC $1.60 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
ON THE STUDYING OF AN ALLERGIC SKIN REACTION AS AN INDICATION OF IMMUNITY TO TULAREMIA,
by T. A. Kalitina. 1966, 13p. Rept. no. Trans-43,
TT 66-60920
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n6 1956.

Descriptors: (*Pasteurella, Immunity), (*Immunity, Test methods), (*Allergy, Pasteurella), Diseases, Skin, Diagnosis, Immunology, Antigen - antibody reactions, Biopsy, Pathology, Brucella, Mycobacterium tuberculosis, Guinea pigs, USSR

The cutaneous allergical reaction in tularemia is specific. The periodic positive reaction to brucellin in animals immune to tularemia has to be considered in practice. In guinea pigs, immune to brucellosis and tuberculosis, the allergical skin reaction, upon the introduction of tularin, was not present. Non-immune guinea pigs, given a single ordinary intracutaneous injection of tularin, responded with a transitive formation of antibodies in low titers (1:10 - 1:20). However, even multiple (during a month) intracutaneous introductions of ordinary doses of tularin did not create any allergical skin reaction in immune guinea pigs. During pathological analysis of the reaction of the skin of animals immune to tularemia, characteristics traits, which are included in the proliferation of the histocytic elements with the formation of cells of an epithelioid nature and uniting later with the lymphoid infiltration, were clarified. An allergical skin reaction to tularemia does not appear in all types of animals, in which a highly intensive immunity was experimentally obtained by recovery from the infection of tularemia. Therefore the intracutaneous tularin test for the diagnosis of tularemia cannot be utilized in all types of animals. (Author)

AD-630 736 Fld. 6/13
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
SEARCH FOR EFFECTIVE VACCINES AGAINST CERTAIN ZOONOZES. COMMUNICATION I. PREPARATIONS OF ANTHRAX CHEMICAL VACCINE AND THE STUDY OF ITS EFFICACY IN EXPERIMENTAL ANIMALS,
by N. I. Alexandrov, N. E. Gefen, A. P. Budak, Yu. V. Ezepchuk, and A. I. Filippenko. 16 Jun 60, 6p. Rept. no. trans-1333,
TT 66-60928
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n5 p42-6 1961.

Descriptors: (*Bacillus anthracis, Vaccines), Effectiveness, Antigens + antibodies, Immunity, Culture media, Aluminum compounds, Potassium compounds, Adsorption, USSR

A comparatively simple and inexpensive method was developed for the preparation of a chemical anthrax vaccine absorbed by alumino-potassium alums. The data produced on experimental animals evidenced that the vaccine was safe, caused no reactions and appeared to be highly effective. It would be expedient to conduct more extensive and intense studies of the chemical anthrax vaccine, by immunizing large farm animals, and humans. (Author)

AD-630 737 Fld. 6/13
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
CRICETUS AURATUS W. 1939 AS AN EXPERIMENTAL MODEL IN ANTHRAX,
by Yu. S. Voronin, S. A. Dzharylgasov, Yu. S. Pisarevskii, and M. M. Faibich. 1966, 9p. Rept. no. Trans-1394,
TT 66-60929
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n9 p120-5 1963.

Descriptors: (*Bacillus anthracis, Infections), (*Hamsters, Bacillus anthracis), Guinea pigs, Sensitivity, Dosage, Spores, Culture media, Morphology (Biology), Pathology, USSR

An inquiry was made into the susceptibility and infectious sensitivity of Cricetus auratus W., 1939 to B. anthracis in subcutaneous, transdermal, oral and intranasal methods of infection. Cricetus auratus proved to be more sensitive to this bacillus than guinea pigs. Morphological changes in these animals infected subcutaneously were the same as those in other animals. (Author)

AD-630 845 Fld. 6/13
CFSTI Prices: HC $1.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
CURRENT STATUS OF THE TICK-BORNE ENCEPHALITIS PROBLEM,
by S. P. Karpov. Jan 66, 14p. Rept. no. FSTC-HT-23-10-66,
Proj. 2301-6553,
TT 66-60950
Unclassified report

Trans. of Sovetskaya Meditsina (USSR) v26 n4 p41-7 1963.

Descriptors: (*Russian spring summer encephalitis virus, Reviews), Ticks, Virus diseases, Disease vectors, DDT, Tissue culture, Serodiagnosis, Epidemiology, Parasites, Animals, Birds, Antibiotics, Effectiveness, Immunity, Antigens + antibodies, Ecology, Immune serums, USSR

The review of the Soviet and foreign literature on tick -borne encephalitis, which concentrates on research of the past 10 years, touches on the following subjects: terminology, properties of the tick-borne encephalitis virus and its behavior in tissue cultures, serodiagnosis, natural nidi and epidemiology with special reference to wild fowl, ectoparasites of wild animals and birds, methods of serodiagnosis, seroprophylaxis, and effectiveness of DDT as an acaricide. (Author)

AD-630 857 Fld. 6/13
CFSTI Prices: HC $1.10 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
SOME DATA ON ANTHRAX IN KRASNOYARSKIY KRAY,
by G. I. Meshalkin. Mar 66, 7p. Rept. no. FSTC-HT-23-51-66,
Proj. 2301-6553,
TT 66-60962
Unclassified report

Trans. of Zhurnal Mikrobiologii, Epidemiologii i Immunobiologii (USSR) n4 p78-80 Apr 1965.

Descriptors: (*Bacillus anthracis, USSR), Infectious diseases, Epidemiology, Animals, Humans, Diseases

The history of anthrax in Western Siberia, particularly along the Yenisey, is traced from the first officially reported outbreak in 1870 to 1917. Anthrax nidi in Krasnoyarskiy Kray are investigated because they are in the area of reservoirs of hydroelectric power stations scheduled to be built in the near future.

AD-630 995 Fld. 6/13
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
THE SYNERGY OF BACTERIAL TOXINS,
by S. Minervin. 20 Jan 66, 8p. Rept. no. FTD-TT-65-1599, TT 66-60993

Unclassified report

Unedited rough draft trans. from Meditsinskaya Gazeta, 7 Sep p3 1965.

Descriptors: (*Toxins + antitoxins, Strength), Bacteria, Clostridium perfringens, Clostridium tetani, Clostridium botulinum, Staphylococcus, Escherichia coli, Proteus, Etiology, Immune serums, Antigens + antibodies, Amino acids

AD-631 066 Fld. 6/13
CFSTI Prices: HC $2.00 MF $0.50
NAVAL MEDICAL RESEARCH UNIT NO 4 GREAT LAKES ILL
A LABORATORY MANUAL OF BACTERIOLOGICAL AND SEROLOGICAL PROCEDURES USED IN THE IDENTIFICATION OF BETA HEMOLYTIC STREPTOCOCCI.
Final rept. (Revised),
by Paul F. Frank, and Marvin Levinson. Jan 66, 37p. Rept. no. RU-66-7, NAVMED MR005.09-1300.1

Unclassified report

Descriptors: (*Streptococcus, Identification), Instruction manuals, Medical laboratories, Bacteriology, Serodiagnosis, Culture media, Preparation, Laboratory equipment, Medical supplies, Respiratory diseases

A laboratory manual describing the bacteriological and serological procedures used in the identification of beta hemolytic streptococii is presented. This manual is designed to aid the laboratory technician in setting-up a laboratory for the identification of beta hemolytic streptococci. Throughout the manual attention is drawn to the pitfalls commonly encountered by personnel not familiar with the beta hemolytic streptococci. (Author)

AD-630 655 **See Fld. 6/3**

AD-630 728 **See Fld. 6/15**

AD-630 734 **See Fld. 6/5**

AD-630 735 **See Fld. 6/5**

AD-630 738 **See Fld. 6/5**

AD-630 802 **See Fld. 15/2**

AD-630 952 **See Fld. 6/3**

6/14. PERSONNEL SELECTION AND MAINTENANCE (MEDICAL)

AD-631 143 Fld. 6/14
CFSTI Prices: HC $4.60 MF $0.50
NAVAL MEDICAL FIELD RESEARCH LAB CAMP LEJEUNE N C
EVALUATION OF PHYSICAL FITNESS PROGRAM FOR WOMEN MARINES.
Interim rept.,
by Ann Jewett. Mar 66, 44p. Rept. no. Vol. 16/No. 9, NAVMED MF022.01.04-8003.1

Unclassified report

Descriptors: (*Physical fitness, *Marine Corps), (*Females, Marine Corps), Military personnel, Humans, Exercise, Military medicine, Performance tests

The purpose of this study was to evaluate the physical fitness program for Women Marines and to make recommendations for possible improvements. Twenty-two recommendations are offered, including the following: (1) A battery of 5-7 tests be developed to provide objective pass-fail standards based on the fitness needs of Women Marines; the exercise series devised for testing be used on a daily progressive basis during recruit training; (3) the recruit physical fitness program be modified to give more emphasis to the use of activities with high potential for developing fitness and to posture and body mechanics activities; (4) for Women Marines on permanent duty status, emphasis be placed on maintaining the prescribed level of physical fitness as measured by an appropriate standardized test, with the individual free to select her own means of maintaining fitness; (5) special attention be given to providing Women Marines on permanent duty status sufficient opportunity to exercise, place to exercise, and attractive programs of recreational activities; and (6) attention be given to providing qualified leadership for physical fitness activities for Women Marines. (Author)

6/15. PHARMACOLOGY

AD-630 569 Fld. 6/15, 6/16
CALIFORNIA UNIV SAN FRANCISCO MEDICAL CENTER
EFFECT OF HISTAMINE, SEROTONIN, AND ACETYLCHOLINE ON THE PERIPHERAL AIRWAYS,
by H. J. H. Colebatch, C. R. Olsen, and J. A. Nadel. 22 Jan 65, 10p. Contract Nonr-222(55), PHS-HE-06285

Unclassified report

Availibility: Published in Journal of Applied Physiology v21 n1 p217-26 Jan 1966. Copies to DDC users only.

Descriptors: (*Drugs, *Respiratory system), Histamine, Serotonin, Acetylcholine, Respiration, Lungs, Heart, Bronchi, Histology, Injection (Medicine), Contraction, Physiology, Pharmacology, Dogs

Injection of histamine into the right side of the heart of paralyzed, vagotomized, artificially ventilated cats increased transpulmonary pressure swing (delta PTP) within 3 sec, expelled air from the lungs, decreased pulmonary compliance (CL) and increased pulmonary resistance (RL), without decreasing anatomic dead space (Vd). Air expulsion and the decrease in CL were related and independent of the increase in RL. Left heart injections produced delayed and smaller changes. Histological studies made after histamine injection and rapid freezing of the lungs showed constriction of respiratory bronchioles and alveolar ducts (peripheral airway constriction). Right heart injection of serotonin and acetylcholine increased RL more and decreased CL less than histamine, and they decreased Vd, suggesting constriction of conducting airways (bronchoconstriction) as well as peripheral airway constriction. With right heart injection of histamine, serotonin, and acetylcholine in dogs, delta PTP increased prior to constriction of a bypassed tracheal segment. The results show that constriction of the peripheral airways produces characteristic changes that are different from bronchoconstriction. (Author)

AD-630 570 Fld. 6/15, 6/16
CALIFORNIA UNIV SAN FRANCISCO MEDICAL CENTER
NEW METHOD FOR PERFUSING BRONCHIAL ARTERIES: HISTAMINE BRONCHOCONSTRICTION AND APNEA,
by M. A. DeKock, J. A. Nadel, S. Zwi, H. J. H. Colebatch, and C. R. Olsen. 26 Feb 65, 10p. Contract Nonr-222 (55), PHS-HE-06285

Unclassified report

Availability: Published in Journal of Applied Physiology v21 n1 p185-94 Jan 1966. Copies to DDC users only.

Descriptors: (*Histamine, *Respiratory system), Bronchi, Arteries, Contraction, Injection (Medicine), Lungs, Respiration, Nerves, Reflexes, Dogs

A metal tube, with a lumen wide enough to allow adequate aortic flow, was inserted into the thoracic aorta via the abdominal aorta in paralyzed, artificially ventilated dogs. Inflated balloons around each end of the tube isolated from the systemic circulation the aortic segment with the first five aortic intercostal arteries, from which the bronchial arteries arise. Histamine injected into this aortic segment increased pulmonary resistance (RL), decreased dynamic pulmonary compliance (CL), and constricted a segment of cervical trachea isolated from the lower airways and lungs. The changes in RL and CL when histamine was injected into the bronchial arteries were apparently due to a reflex constriction of the conducting airways, while the changes after right atrial injections were due to direct constriction of alveolar ducts and respiratory bronchioles supplied by the pulmonary circulation. In spontaneously breathing dogs, histamine injected into the bronchial arteries caused either decreased tidal volume or apnea; this was occasionally preceded by a deep inspiration and small expiratory movements. (Author)

AD-630 728 Fld. 6/15, 6/13, 6/5
CFSTI Prices: HC $1.10 MF $0.50
ARMY BIOLOGICAL LABS FREDERICK MD
VACCINATION AND CHEMO-VACCINOTHERAPY OF Q FEVER IN WHITE MICE,
by N. G. Kekcheeva, and I. N. Kokorin. 1956, 7p. Rept. no. Trans-92,

Unclassified report

Journal of Microbiology, Epidemology and Immunobiology n11 p46-9, 1956. Prepared in cooperation with N.F. Gamall Inst. of Epidemiology and Microbiology, AMS (USSR).

Descriptors: (*Coxiella, Vaccines), (*Chemotherapy, Coxiella), Rickettsia, Antibiotics, Immunity, Embryonated egg technique, Dosage, Biological assay, Infections, Mice, USSR

The combination of a preliminary vaccination with treatment with biomycin strengthened the action of the latter, which was evident with small doses of the preparation. Regardless of the good effect of the combination of a preliminary vaccination and a later treatment, rickettsia remained in the organism. A combination of vaccination directly with infection and treatment aids in a quicker cleansing of the agent from the organism. (Author)

AD-630 791 Fld. 6/15, 6/18
DEFENCE CHEMICAL BIOLOGICAL AND RADIATION LABS OTTAWA (ONTARIO)
AN ENZYMATIC EVALUATION OF THIOL RADIOPROTECTORS,
by J. F. Scaife. 16 Aug 65, 13p. Rept. no. DCBRL-477,

Unclassified report

Availability: Published in Canadian Journal of Biochemistry v44 p319-30 1966. Copies to DDC users only.

Descriptors: (*Thiols, Radioprotective agents), (*Radioprotective agents, Test methods), (*Enzymes, Radioprotective agents), Glutaric acid, Ketones, Oxidation, Tissue extracts, Inhibition, Sulfides, Adenosine phosphates, Mitochondria, Phosphorylation, Metabolism

A number of thiol and disulfide compounds were tested for their ability to inhibit the oxidation of alpha-ketoglutarate by rat-liver homogenates. In general, a correlation exists between the degree of inhibition and the radioprotective ability of the compound. It is possible that a better correlation exists for the corresponding disulfides. The inhibition involves oxidation of the thiol, and the disulfides were found to be more potent inhibitors than the thiols. There is no change in the ATP level of

noethylisothiouronium bromide hydrobromide in vivo, and the protective ability of this compound is not considered to be related to any interference with mitochondrial oxidative phosphorylation. Mitochondrial respiration is, however, inhibited. The results support the mixed disulfide protection theory of Eldjarn and Pihl, and provide a physiologically significant test system for this hypothesis. (Author)

AD-630 787 **See Fld. 6/3**

6/16. PHYSIOLOGY

AD-630 645 Fld. 6/16, 5/10
ARMY MEDICAL RESEARCH LAB FORT KNOX KY EXPERIMENTAL PSYCHOLOGY DIV
RECOVERY FROM THE EFFECTS OF ISOMETRIC MUSCLE CONTRACTIONS,
by Lee S. Caldwell. 1964, 14p. Proj. 3A014501A74D
USAMRL 650

Unclassified report

Availability: Published in Journal of Engineering Psychology v4 n1 p22-9 Jan 65. Copies to DDC users only.

Descriptors: (*Muscles, Fatigue (Physiology)), (*Fatigue (Physiology), Recovery), Motor reactions, Strength, Loading (Mechanics), Metabolism, Acids, Contraction, Applied psychology, Performance (Human)

The purpose of the investigation was to determine the recovery functions for moderately light and heavy isometric muscle contractions. The maximum response strength was determined for each S who was then required to maintain either a moderate or a heavy load as long as possible, and the contraction time (endurance) was measured. Each load was a given percentage of S's maximum response strength. The ability to maintain the same load was then determined after various rest intervals. Endurance recovery was expressed as the ratio of the second endurance score to the first. Recovery from the effects of exertion was found to follow a negatively accelerated growth function with endurance recovery being faster for the heavy load than for the lighter one. (Author)

AD-630 646 Fld. 6/16, 5/10
ARMY MEDICAL RESEARCH LAB FORT KNOX KY EXPERIMENTAL PSYCHOLOGY DIV
ACCURACY OF ACTIVE AND PASSIVE POSITIONING OF THE LEG ON THE BASIS OF KINESTHETIC CUES,
by Andree J. Lloyd, and Lee S. Caldwell. 22 Jun 64, 12p. Proj. PA-3A014501A74D
USAMRL 651

Unclassified report

Availability: Published in Journal of Comparative and Physiological Psychology v60 n1 p102-6 1965. Copies to DDC users only.

Descriptors: (*Positioning reactions, Extremities), Legs, Motion, Joints (Physiology), Noise, Muscles, Electrophysiology, Psychophysiology

Accuracy of positioning was significantly influenced by the mode of movement and by goal positions. The range of greatest accuracy for active movement coincided with the normal walking arc of the lower leg. Thus accuracy of positioning may be best for the condition and in the range of movements in which there has been greater prior practice, or possibly the distribution and rate of firing of the receptors may favor discrimination in this range. These data suggest that the joint receptors not only provide information, but also are a source of potential noise in the afferent system. (Author)

AD-630 712 Fld. 6/16, 6/19
CFSTI Prices: HC $2.00 MF $0.50
GEOSCIENCE LTD LA JOLLA CALIF
THERMAL AND ELECTRICAL CONDUCTIVITIES OF BIOLOGICAL FLUIDS AND TISSUES.
Annual rept. for 1 Apr 65-31 Mar 66,
by Heinz F. Poppendiek, Norman D. Greene, W. A. Morton, P. M. Morehouse, and R. Randall. 31 Mar 66, 43p. Rept. no. GLR-43,
Contract Nonr-4095 (00),

Unclassified report

See also AD-630 303.

Descriptors: (*Body fluids, Thermal conductivity), (*Thermal conductivity, Tissues (Biology)), (*Electrical conductance, Body fluids), (*Blood, Freezing), Stress (Physiology), Cryogenics, Erythrocytes, Hemolysis, Blood plasma, Storage, Bovines, Brain, Kidneys, Liver, Mathematical models, Mathematical prediction, Morphology (Biology)

The objective of the research program has been the experimental and analytical determination and correlation of thermal and electrical conductivities of biological fluids and tissues both under normal and stressed conditions. The stressing consists of freeze-thaw processes at slow and rapid rates. A second objective of the program has been to establish the relations between changes in these physical properties of biological specimens and the physical stresses imposed upon them. (Author)

AD-630 921 Fld. 6/16
CFSTI Prices: HC $2.00 MF $0.50
LANKENAU HOSPITAL RESEARCH INST PHILADELPHIA PA
EFFECT OF EXERCISE, STANDING, NEGATIVE TRUNK AND POSITIVE SKELETAL PRESSURE ON BED REST-INDUCED ORTHOSTATIS AND HYPERCALCIURIA.
Final rept., Feb 64-Jan 65,
by N. C. Birkhead, J. J. Blizzard, B. Issekutz, Jr., and K. Rodahl. Jan 66, 36p. Contract AF 33 (615)-1538, Proj. AF-7164, Task 716405, AMRL TR-66-6

Unclassified report

Descriptors: (*Calcium, Excretion), (*Relaxation (Physiology), Metabolism), Exercise, Skeleton, Bone, Pressure, Urine, Tolerances (Physiology), Blood pressure, Pulse rate, Posture, Tables

Tilt intolerance and hypercalciuria were induced in healthy subjects fed weighed diets by 18-32 days continuous bed rest in a Metabolic Ward. The effect of supplementing bed rest with daily supine bicycle exercise (2 or 4 hours), quiet standing (3 hours), or longitudinal supine skeletal pressure on orthostasis and urinary calcium was determined. Tilt tolerance was evaluated by blood pressure and heart rate response to 10 minutes of 70 head-up body tilt and urinary calcium excretion by analysis of 3- or 6-day urine collections. Supine bicycle exercise was ineffective in significantly reducing tilt intolerance or hypercalciuria. Standing decreased orthostasis in 3 of 5 subjects and decreased urinary calcium in 4 of 5 subjects. Longitudinal skeletal pressure decreased hypercalciuria in 1 of 2 subjects but did not improve tilt tolerance. Intermittent lower body negative pressure during bed rest in one subject impeded development of orthostasis but increased urine calcium. Three hours daily standing is the minimum effective duration for reversing bed rest-induced tilt intolerance and hypercalciuria while supine bicycle exercise is not a practical method for obtaining similar effects. (Author)

AD-630 938 Fld. 6/16, 6/1, 6/3
CFSTI Prices: HC $15.00 MF $1.00
UNIVERSIDAD DE LA REPUBLICA MONTEVIDEO (URUGUAY) INSTITUTO DE NEUROLOGIA
DEVELOPMENT OF SKELETAL MUSCLE.
Rept. no. 4, 15 Mar 65-15 Mar 66 (Annual),
by Maria Antonieta Rebollo. 15 Mar 66, 194p. Contract DA-ARO-49-092-64-G42, Proj. DA-2N014501B71D-00-010-LA

Unclassified report

See also AD-619 442.

Descriptors: (*Musculoskeletal system, Embryology), Muscles, Tissues (Biology), Growth, Nerves, End organs, Morphology (Biology), Histology, Electron microscopy, Enzymes, Lipids, Alkaloids, Aldehyde-lyases, Oxidoreductases, Nervous system, Physiology, Embryos, Chickens, Rats

The morphological and histochemical study of the development of skeletal muscle in chick and rat embryos was continued. Features of the muscle growth mechanism, growth curves of fibers and degenerative phenomena in morphogenesis are discussed. Lipases, diaphorases and linked-dehydrogenases were studied and the parallelism of findings with lipids is demonstrated. An ultrastructural study of the chick showed special type sensory ending, different from mammals; 3 types of introfusal fibers. Established also were the onset of spindle differentiation, when they acquire sensory and motor endings, how chemical elements appear and when they attain maturity.

AD-630 954 Fld. 6/16, 6/18
TORONTO UNIV (ONTARIO) DEPT OF MEDICAL BIOPHYSICS
A TRANSPLANTATION ASSAY FOR MOUSE CELLS RESPONSIVE TO ANTIGENIC STIMULATION BY SHEEP ERYTHROCYTES,
by J. C. Kennedy, L. Siminovitch, J. E. Till, and E. A. McCulloch. 14 Sep 65, 6p. Contract MA-1420 ,DRB-9350-14

Unclassified report

Availability: Published in Proceedings of the Society for Experimental Biology and Medicine v120 p868-73 1965. Copies to DDC users only.

Descriptors: (*Erythrocytes, Immunity), (*Hemolysin, Production), Transplantation, Biological assay, Mice, Cells (Biology), Spleen, Lymphatic system, Antigens + antibodies, Stimulation, Mammals, Gamma rays, Canada

When cell suspensions containing normal mouse spleen or lymph node cells mixed with sheep erythrocytes are injected into heavily-irradiated mice, foci of hemolysin-producing cells are formed in the spleens of the recipients. A method is described for demonstration of these foci, and evidence is presented that they result from the proliferation of antigen-sensitive precursors of hemolysin-producing cells. The demonstration of the existence of 'antigen-sensitive' cells provides strong support for the view that cell proliferation is involved in the generation of hemolysin-producing cells. (Author)

AD-630 977 Fld. 6/16, 6/3
TORONTO UNIV (ONTARIO) DEPT OF PHYSIOLOGY
FREE FATTY ACID METABOLISM IN CHINESE HAMSTERS,
by James Campbell, and G. R. Green. 29 Oct 64, 11p. Contract DRB-8865-04,

Unclassified report

Availability: Published in Canadian Journal of Physiology and Pharmacology v44 p47-57 1966. Copies to DDC users only.

Descriptors: (*Hamsters, Diabetes), (*Diabetes, Fatty acids), (*Fatty acids, Metabolism), Adipose tissue, Glucose, Blood serum, Insulin, In vitro analysis, Diet, Canada

In normal Chinese hamsters (Cricetulus griseus) the mean concentration of free fatty acids (FFA) in serum varied from group to group, but was (i) consistently 4 to 9 times greater than in rats, dogs, or man; (ii) slightly higher than in Syrian hamsters;

(iii) two- to four-fold higher than in fasting or alloxan-diabetic rats. The epididymal adipose tissue of the Chinese hamster (i) had initial concentrations of FFA comparable to those in the rat and Syrian hamster; (ii) released, in the same time interval, 8- to 10-fold more FFA in vitro than this tissue of the rat; (iii) had higher concentrations of FFA after incubation than the incubated tissue of the rat. The retroperitoneal (perirenal) adipose tissue of the Chinese hamster was less active in release of fatty acids in vitro than the epididymal, but was, however, more active than the epididymal adipose tissue of the rat. These characteristics of FFA metabolism in the Chinese hamster were apparently attributable to species, not to age, diet, or sex. In the Chinese hamster, the weight of the epididymal adipose tissue per gram of body was relatively high. It appears that in this species the rate of release of fatty acids from adipose tissue is great, leading to high FFA concentrations in serum. In Chinese hamster and rat adipose tissues in vitro, glucose and insulin (separately) reduced the rate of release of FFA and the amount of FFA in the tissues, but glucose and insulin together produced the greatest reductions. The net reduction in FFA release by glucose and insulin in vitro was greater in tissue from the Chinese hamster. (Author)

AD-630 993 Fld. 6/16, 6/12, 14/2
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
A METHOD FOR THE SIMULTANEOUS REGISTRATION OF SOME INDICES OF THE ACTIVITY OF THE SALIVARY GLAND,
by N. Y. Vakolyuk. 21 Jan 66, 7p. Rept. no. FTD-TT-65-1520,
Unclassified report

Unedited rough draft trans. of Fiziologichnyi Zhurnal (USSR) v9 n6 p829-30 1963.

Descriptors: (*Salivary glands, Secretion), Measurement, Test methods, Laboratory equipment, Dogs, USSR

AD-631 139 Fld. 6/16
CFSTI Prices: HC $1.60 MF $0.50
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF PHYSIOLOGY AND BIOCHEMISTRY
CARDIOVASCULAR RESPONSES OF DIVING AND NONDIVING MAMMALS TO APNEA.
Technical rept., Jan-Jul 65,
by F. L. Ferrante, and H. M. Frankel. Feb 66, 16p. Contract AF 41 (609)-2635, Task 775801, SAM TR-66-17
Unclassified report

Descriptors: (*Cardiovascular system, Adaptation (Physiology)), (*Respiration, Mammals), (*Mammals, Cardiovascular system), Blood pressure, Heart, Blood circulation, Heart rate, Lungs, Underwater, Hypoxia, Chemoreceptors, Tolerances (Physiology), Cats

Heart rate, arterial and right atrial blood pressure, and cardiac output were monitored continuously before and during periods of apnea in anesthetized nutria and cats. In the nutria, arterial blood pressure was maintained an average of 182 seconds after profound bradycardia developed despite a decreased cardiac output. In cats arterial blood pressure began to decrease at 81 plus or minus 5.5 seconds, an average of 51 seconds before profound bradycardia was observed. The increase in peripheral resistance during apnea in cats was less than 20% of that found in nutria. Evidence of cardiac failure was found before bradycardia in the cat, but not in the nutria. It was concluded cardiovascular responses reported for diving mammals could be initiated by hypoxia and hypercapnia independent of intrathoracic pressure changes and the response of receptors in the nares sensitive to water. (Author)

AD-630 569 **See Fld. 6/15**

AD-630 570 **See Fld. 6/15**

AD-630 787 **See Fld. 6/3**

AD-630 973 **See Fld. 6/1**

AD-631 142 **See Fld. 6/5**

6/18. RADIOBIOLOGY

AD-630 647 Fld. 6/18, 6/5
ARMY MEDICAL RESEARCH LAB FORT KNOX KY BIOPHYSICS DIV
A CONSIDERATION OF THE BIOLOGICAL EFFECTS OF LASER,
by Alan J. McCartney. 1965, 15p. Proj. DA-3A014501A71E,
USAMRL 654
Unclassified report

Availability: Published in Military Medicine v130 n11 p1069-77 Nov 1965. Copies to DDC users only.

Descriptors: (*Lasers, Pathology), Head, Eye, Skin, Cancer, Tissues (Biology), Radiation injuries, Damage, Radiation hazards, Tissue culture cells, Animals, Humans, Biophysics, Therapy, Ophthalmology, Reviews

The pertinent work on the biological effects of laser is reviewed. The physical properties of laser radiation are described and a correlation with these properties and the observed biological effects is attempted. The biological effects of laser are described in some detail with regard to: intact animals; primate eyes; skin and malignant tumors of animal and human origin. Laser radiation is capable of inflicting severe damage on the unprotected eye. Laser appears to have some promise in selected medical fields such as cellular research, cancer therapy, and ophthalmology. (Author)

AD-630 697 Fld. 6/18, 18/6
CFSTI Prices: HC $2.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
DOSE-ATTENUATION VARIATION WITH INCIDENT GAMMA-RAY ENERGY IN TWO-LEGGED CONCRETE AND STEEL DUCTS.
Technical rept., Dec 64-Oct 65,
by J. M. Chapman. Apr 66, 20p. Rept. no. TR-R-442,
Proj. Y-F008-05-201 ,DASA-11.058
Unclassified report

Descriptors: (*Dose rate, Attenuation), (*Shelters, Dose rates), Ducts, Albedo, Gamma rays, Concrete, Steel, Cesium, Gold, Cobalt

Gamma-ray dose-attenuation factors were measured in concrete and steel ducts. For concrete, 3-foot-square and 11-inch-square ducts were used with Au (198) (0.412 Mev), Cs (137) (0.662 Mev), and Co (60) (1.25 Mev) gamma -ray sources. Attenuation factors for given geometries were compared as a function of incident gamma-ray energy. The relative effectiveness of steel and concrete ducts of a given geometry was determined. The attenuation factor decreases monotonically with increasing energy in concrete ducts. In the 11-inch steel duct the attenuation factor for the high-energy source (Co (60)) was greater than for the low-energy source (Cs (137)). In comparing the 11-inch concrete and 11-inch steel ducts, it was found that dose rates in the concrete duct were higher by a factor of about 2. Measured attenuation factors were compared with values obtained using a computer code based on the albedo concept. It was found that calculated attenuation factors agree to within + or -30% of the measured attenuation factors. (Author)

AD-630 870 Fld. 6/18
CFSTI Prices: HC $2.60 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
AN ULTRASTRUCTURAL STUDY OF THE DEVELOPMENT OF RADIATION INJURY IN THE LUNG,
by Theodore L. Phillips. 1 Feb 66, 23p. Rept. no. USNRDL-TR-973,
NAVMED MR005.08-5201
Unclassified report

Descriptors: (*Lungs, *Radiation injuries), Radiological dosage, Collagen, Cells (Biology), Membranes (Biology), Capillaries, X rays, Tissues (Biology), Electron microscopy

Radiation doses of 2000 R were given to the left hemithorax of a group of 25 rats. At intervals of from one hour to one year following irradiation sections of the lung were examined with the electron microscope. The initial site of radiation damage appears to lie chiefly in the endothelium. The endothelium is sloughed and the original endothelial space is replaced by collagen and mast cell infiltrates. Some capillaries are recanalized by new endothelial cells. Eventually these capillaries attain an appearance similar to that of the original capillary but with a slightly thickened endothelium and basement membrane. If the original capillary architecture is not maintained, massive fibrosis results. The mast cell participates extensively in the repair of the radiation damage and is closely associated with collagen and new capillary formation. It is stressed that the degree of damage occurring after a given dose of irradiation varies widely and that these observations were made on only small samples of lungs. (Author)

AD-631 144 Fld. 6/18
CFSTI Prices: HC $2.60 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
RADIATION-INDUCED FREE POLYDEOXYRIBONUCLEOTIDES IN LYMPHOID TISSUES: A PRODUCT OF THE ACTION OF DEOXYRIBONUCLEASE I,
by L. J. Cole, and K. F. Swingle. 1 Mar 66, 24p. Rept. no. USNRDL-TR-983,
NAVMED MR005.08-1200-7
Unclassified report

Descriptors: (*Lymphatic system, Radiation effects), (*Nucleotides, Radiobiology), (*Desoxyriboneuclic acids, Radiation effects), X rays, Whole body irradiation, Spleen, Polymers, Molecular weight, Thermal properties, Histones, Carboxylic ester hydrolases, Ribonuclease

Physico-chemical studies on the saline-extractable polydeoxyribonucleotides (PDN) occurring in lymphoid tissues 4 hours after whole-body exposure to 600 rads X-irradiation revealed the following information: (1) Viscosity, precipitability by acids and alcohols, and behavior on gel-filtration columns suggest a molecular weight less than that of undegraded DNA but probably greater than 100000. (2) Thermal transition curves indicate extensive complementary double stranding with slight 'fraying' of the ends of the strands. (3) In 0.2 M NaCl, PDN has a lower affinity for histone than does DNA. (4) Susceptibility of PDN to the action of venom phosphodiesterase (EC 3.1.4.1) and resistance to spleen phosphodiesterase (EC 3.1.4.1) demonstrate the presence of 3'-hydroxyl terminals and the absence of 5'-hydroxyl terminals. (5) The above observations suggest that PDN was formed from DNA by the action of a deoxyribonuclease I-like (EC 3.1.4.5) endonuclease rather than a deoxyribonuclease II-like (EC 3.1.5.6) endonuclease in the irradiated tissue. (Author)

AD-631 189 Fld. 6/18
CFSTI Prices: HC $2.60 MF $0.50
AIR FORCE WEAPONS LAB KIRTLAND AFB N MEX
MEDIAN LETHAL DOSE (LD-50/60) STUDIES IN SHEEP FOLLOWING 250-KVP X-IRRADIATION.

Technical rept. for Aug 61-May 63,
by Thomas S. Mobley, William R. Godden, and Jelle deBoer. Mar 66, 29p. Rept. no. AFWL-TR-65-200.
Proj. AF-5710 ,AF-7810
Unclassified report

Descriptors: (*Lethal dosage, *Mammals), (*Cardiovascular system, Radiation effects), X rays, Whole body irradiation, Dosage, Mortality rates, Blood cells

Seventy-four sheep, Ovis aries, were subjected to bilateral, total-body, 250-kvp x-irradiation at a dose rate of 7.5 r/min. Doses ranging from 218 to 518 r (midline air dose) were administered at nine different dose levels. Probit analysis of the mortality data revealed a 50-percent, 60-day (LD-50/60) lethal dose value of 389 r with 95-percent confidence limits of from 334 r to 437 r. Converting midline air dose to midline tissue dose resulted in the value 245 r with limits of from 210 r to 275 r. All deaths occurred between 16 and 32 days following irradiation. Hematological studies and gross necropsies confirmed the severe involvement of the hematologic system. (Author)

AD-630 605 See Fld. 18/8

AD-630 791 See Fld. 6/15.

AD-630 954 See Fld. 6/16

AD-631 145 See Fld. 6/1

6/19. STRESS PHYSIOLOGY

AD-630 578 Fld. 6/19
MCGILL UNIV MONTREAL (QUEBEC) AVIATION MEDICAL RESEARCH UNIT
PREDOMINANCE OF ANTI-COMPENSATORY OCULOMOTOR RESPONSE DURING RAPID HEAD ROTATION,
by G. Melvill Jones. 1965, 4p. Contract DRB-9310-92,
Unclassified report

Availability: Published in Aerospace Medicine v35 n10 p965-8 Oct 1964. Copies to DDC users only.

Descriptors: (*Nystagmus, Aviation medicine), (*Head, Rotation), Eye, Response, Muscles, Visual acuity, Retina, Proprioception, Vestibular apparatus, Semicircular canals, Roll, Canada

Experiments with human subjects are described which show that when the head is jerked with high angular velocity, say to the right, large anti-compensatory flicks drive the eyes well over in the leading direction, in this case to the right, where they remain until the head slows down. Then the expected compensatory response to the left begins to appear. If the high head angular velocity is artificially maintained, as on a turntable, the expected compensatory response may be virtually eliminated for several seconds, presumably owing to prolonged action of a strongly maintained anti-compensatory response. This phenomenon can occur in the rolling plane and has been demonstrated during flight in the initial stages of a rapid rolling manoeuvre. Presumably consequent failure of retinal image stabilisation could cause serious impairment of visual acuity at this critical moment. The fact that exclusion of vision and neck proprioception do not prevent predominance of the anti-compensatory response, points to a vestibular cause. This in turn suggests that vestibular signals can exercise a substantial measure of control over the quick, anti-compensatory, phase of nystagmus. (Author)

AD-630 579 Fld. 6/19
ROYAL VICTORIA HOSPITAL MONTREAL (QUEBEC)
EFFECT OF CO2 AND WHOLE-BODY VIBRATION ON VENTILATION,
by W. A. Young, D. B. Shaw, J. Navach, H. Shizgal, and N. Kowalsky. 30 Jul 64, 6p. Contract DRB-9310-84,
Unclassified report

Availability: Published in Journal of Applied Physiology v20 n5 p844-8 Sep 1965. Copies to DDC users only.

Descriptors: (*Carbon dioxide, Respiration), (*Vibration, Respiration), (*Hyperventilation, Vibration), Sensitivity, Stimulation, Thresholds (Physiology), Stress (Physiology), Canada

The ventilatory response of six subjects to increasing levels of alveolar CO2 was measured at rest and during the hyperventilation induced by passive vibratory movements of the whole body. During vibration, addition of CO2 to the inspired air produced no increase in ventilation until the PACO2 reached a critical level which coincided closely with the intersection of the vibration with the resting CO2 response curve. Above this level the vibration curve was almost superimposed on the resting one. There was no evidence of an additive effect of the two stimuli, and no increase in sensitivity to CO2 during vibration. In these respects the situation differs from that in which CO2 is combined with hypoxia or hyperthermia. The findings indicate that when respiration is stimulated by vibration and CO2 simultaneously, the resultant ventilation at any point is solely that produced by the stronger of the two stimuli. (Author)

AD-630 785 Fld. 6/19
TECHNOLOGY INC DAYTON OHIO
EVALUATION OF PEAK VS. RMS ACCELERATION IN PERIODIC LOW FREQUENCY VIBRATION EXPOSURES,
by P. J. Martin, H. C. Wooding, N. P. Clarke, G. C. Mohr, and J. W. Brinkley. Nov 65, 11p. Contract AF 33 (615)-1894, Proj. AF-7231, Task 723101,
AMRL TR-65-67
Unclassified report

Availability: Published in Aerospace Medicine v36 n11 p1083-9 Nov 1965. Copies to DDC users only.

Descriptors: (*Aviation medicine, Vibration), (*Vibration, Performance (Human)), Acceleration, Low altitude, Flight speeds, Turbulence, Gusts, Flight crews, Pilots, Response, Hands, Motion, Extremely low frequency

Subjects were exposed to vibrations with varying peak and RMS accelerations and frequencies to explore the relative importance of these parameters in determining the effect of the vibration produced by turbulence in low altitude high speed flight. For various RMS acceleration levels and frequency contents, pairs of periodic vibration exposures having the same RMS but different peak accelerations were evaluated using both a subjective severity rating and a measure of vibration induced hand motion. The higher peak acceleration of the various pairs having the same RMS values was subjectively rated more severe in 32 of 40 observations. However, when attempting to hold the hand in a fixed position during vibration, the induced deviations from the null point, expressed either as average or peak-to-peak errors appeared to depend more on RMS acceleration and frequency than on the small differences in peak acceleration studied here. (Author)

AD-630 788 Fld. 6/19
CFSTI Prices: HC $2.60 MF $0.50
AEROMEDICAL RESEARCH LAB (6571ST) HOLLOMAN AFB N MEX
AN INVESTIGATION OF THE RELATIONSHIP BETWEEN EXPERIENCE PARAMETERS AND SUBJECT ACCELERATION RESPONSE IN EXPERIMENTAL IMPACT.
Rept. for Feb 65,
by Peter Foster. Mar 66, 24p. Rept. no. 6571-ARL-TR-66-8,
Unclassified report

Descriptors: (*Acceleration tolerance, Humans), Impact shock, Exposure, Electrocardiography, Blood pressure, Respiration, Statistical analysis, Tables, Space medicine

Studies of human test subjects undergoing sustained acceleration on the centrifuge have shown that tolerance increases with experience. This fact suggested the need for an investigation to determine if a similar relationship existed between certain impact experience parameters and subject acceleration response, which was used as an indicator of subject tolerance to impact exposure. A number of human test subjects having varying degrees of experience with experimental impact acceleration were exposed to identical impact profiles. Correlations of experience factors to indicated tolerance showed no significant relationship. (Author)

AD-630 946 Fld. 6/19
CFSTI Prices: HC $3.00 MF $0.75
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
OTOLITH SHEAR AND THE VISUAL PERCEPTION OF FORCE DIRECTION: DISCREPANCIES AND A PROPOSED RESOLUTION.
Joint rept.,
by Manning J. Correia, W. Carroll Hixson, and Jorma I.Niven. Dec 65, 76p. Rept. no. NAMI-951,
Contract NASA Order-R-93,
NAVMED MR005.13-6001-1-126
Unclassified report

Descriptors: (*Acceleration, *Visual perception), Linear accelerators, Experimental data, Space perception, Stress (Physiology), Head, Ear, Posture, Space medicine, Shear stresses, Equations, Functions, Statistical analysis

Judgments of subjective vertical and horizon were obtained during exposure to five angular directions and five magnitudes of linear acceleration stimuli varied independently on a human centrifuge. The visual perception of the orientation of the force field could not be shown to be a linear function of the otolith shear-directed component, and discontinuities in response for identical stimuli were observed. A tangent equation expression which resolves these discrepancies and better predicts the subjective response is proposed. A rationale for this equation and generalizations relative to extraterrestrial environments are discussed. (Author)

AD-630 947 Fld. 6/19
CFSTI Prices: HC $1.00 MF $0.50
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
ELICITATION OF HORIZONTAL NYSTAGMUS BY PERIODIC LINEAR ACCELERATION.
Joint rept.,
by Jorma I. Niven, W. Carroll Hixon, and Manning J.Correia. Dec 65, 24p. Rept. no. NAMI-953,
Contract NASA Order-R-93,
NAVMED MR005.13-6001-1-128
Unclassified report

Descriptors: (*Nystagmus, *Acceleration), Linear accelerators, Vestibular apparatus, Semicircular canals, Sensation (Physiology), Stimulation, Gravity, Head, Posture, Eye, Motion, Visual perception, Space medicine

Four subjects in each of four different body orientations were exposed to periodic linear acceleration stimuli produced by simple harmonic translation of 0.2, 0.4, and 0.8 cps cyclic frequency along an Earth horizontal axis. Highly systematic horizontal nystagmus was demonstrated in response to these stimuli as well as to linear accelerations of rotating vector form equivalent to counterrotation in a constant magnitude linear force field. Vertical nystagmus could not be demonstrated for similar stimuli. The magnitude of the slow component of nystagmus and the phase lag of the nystag-

mic response behind the linear acceleration stimulus were found to differ from those associated with periodic angular stimulation of the semicircular canals in a comparable frequency range. Regardless of stimulus form, the effective stimulus element for elicitation of horizontal nystagmus appeared to be dynamic change in the linear acceleration component directed along the subject's y (left-right) head axis. (Author)

AD-630 979 Fld. 6/19
LAVAL UNIV QUEBEC DEPT OF PHYSIOLOGY
STUDIES ON HABITUATION TO COLD PAIN,
by Jacques LeBlanc, and Pierre Potvin. 14 Oct 65, 7p. Contract DRB-9310-79,
Unclassified report

Availability: Published in Canadian Journal of Physiology and Pharmacology v44 p287-93 1966. Copies to DDC users only.

Descriptors: (*Adaptation (Physiology), *Pain), Low-temperature research, Acclimatization, Hands, Stress (Physiology), Canada

It was possible to produce habituation to cold in a group of human subjects by immersing the left hand in cold water for 2 1/2 minutes twice a day for 19 days. The right hand did not adapt. Another group of subjects was exposed similarly with the difference that an axiety test (mental arithmetic test) was always given simultaneously with the cold-water test. In this second group the original blood pressure response, i.e. for the first day, was greater than in the first group because of the cumulative effects of the two tests. After 19 days definite evidence was obtained for adaptation to these two tests administered together. However, when these tests were given separately to the second group, no adaptation was evident; adaptation occurred only to both tests given simultaneously. These results indicate that no adaptation develops to cold per se if the subjects are distracted from cold discomfort. It was also found that adaptation of one hand to cold water not only failed to induce adaptation in the opposite hand but even reinforced responses of the unadapted hand. These findings suggest a participation of the central nervous system in adaptation to cold pain, and tend to minimize the importance of local peripheral changes. (Author)

AD-630 991 Fld. 6/19
CFSTI Prices: HC $1.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
HISTOMORPHOLOGICAL CHANGES IN THE INTERNAL EAR OF DOGS UNDER THE EFFECT OF RADIAL ACCELERATIONS,
by S. S. Markaryan, and R. E. Kogan. 17 Mar 66, 13p. Rept. no. FTD-TT-65-1356, TT 66-60995
Unclassified report

Unedited rough draft trans. of Vestnik Oto-Rino Laringologii (USSR) v26 n2 p17-21 1964.

Descriptors: (*Acceleration tolerance, Ear), (*Ear, Hemorrhage), Acceleration, Gravity, Blood circulation, Lymph, Histology, Morphology (Biology), Tissues (Biology), Otorhinolaryngology, Reviews, Dogs, USSR

Twelve dogs were subjected to the action of accelerations within the limits of 2.4 - 14.5g, the time ranging from 4 to 20 minutes. In the internal ear of dogs, the venous circulation became disturbed, this resulting in protracted hemorrhages in the perilymphatic spaces of the cochlea and subepithelial connective tissue of sace and ampules. Hemorrhages in the internal ear resolved much slower than hemorrhages occuring in the middle ear or in the internal acoustic meatus. (Author)

AD-631 137 Fld. 6/19
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO
UPPER THERMAL TOLERANCE LIMITS FOR UNIMPAIRED MENTAL PERFORMANCE.
Final rept.,
by John F. Wing. Oct 65, 9p. Rept. no. AMRL-TR-65-71,
Proj. AF-1710, Task 171002,
Unclassified report

Availability: Published in Aerospace Medicine v36 n10 p960-4 Oct 1965. Copies to DDC users only.

Descriptors: (*Heat tolerance, Performance (Human)), Stress (Physiology), Exposure, Reasoning, Problem solving, Memory, Recall

Fourteen experiments done in various laboratories have assessed the effects of high thermal stress on mental performance. These experiments represent different combinations of exposure time and effective temperature. When the results of these studies are reviewed, they indicate that the upper thermal limit for unimpaired mental performance varies systematically with exposure duration. Specifically, the lowest test temperatures yielding statistically-reliable decrements in mental performance decline exponentially as exposure durations are increased up to four hours. When this temperature-duration curve for mental performance is compared with physiological tolerance cures, it is found to lie well below them at every point in time. (Author)

AD-631 151 Fld. 6/19
CFSTI Prices: HC $3.00 MF $0.75
GARRETT CORP LOS ANGELES CALIF AIRESEARCH MFG DIV
REDUCED BAROMETRIC PRESSURE AND RESPIRATORY WATER LOSS.
Rept. for 1 Apr-31 Oct 64,
by Edward C. Wortz, Robert A. Diaz, Frederick H. Green, Warren G. Sanborn, and David K. Edwards,III.. Feb 66, 81p. Contract AF 41 (609)-2389, Task 793002,
SAM TR-66-4
Unclassified report

Descriptors: (*Respiration, Moisture), Barometric pressure, Water, Humidity, Exercise, Atmospheric temperature, Body temperature, Low-pressure research

Respiratory water loss was investigated with a group of normal subjects breathing oxygen orally. Data were collected from all subjects under three absolute pressures (3.5, 7.0, and 14.7 p.s.i.), three work rates on a treadmill (0, 2, and 4 m.p.h.), three humidities of the inspired oxygen (40F., 60F., and 80F. dewpoint), and three drybulb temperatures of the inspired oxygen (95F., 75F., and 55F.). The data were analyzed statistically. All of these variables affected respiratory water loss in varying degrees. Reduced pressure diminished respiratory water loss, apparently because of a corresponding decrease in minute volume observed at lower pressures. Increased work rates elevated pulmonary ventilation and thus increased respiratory water loss. Increasing humidity decreased water loss, while increasing drybulb temperature produced greater water loss. Expired gas temperatures approached body temperature only at elevated inspired temperature; the expired gas volume was never saturated. (Author)

AD-630 707 See Fld. 6/3

AD-630 712 See Fld. 6/16

AD-630 879 See Fld. 22/1

6/20. TOXICOLOGY

AD-630 593 Fld. 6/20, 7/2
CFSTI Prices: HC $2.00 MF $0.50
OREGON STATE UNIV CORVALLIS RADIATION CENTER
EXPOSURES OF BIOLOGICAL SYSTEMS TO INORGANIC FLUORIDE OXIDIZING AGENTS. VOLUME II. FLUORIDE ANALYSIS BY CHEMICAL METHODS.
Final rept. 1 Jul 64-30 Jun 65,
by Donald J. Reed, Frank N. Dost, and Chih H. Wang. Dec 65, 27p. Contract AF 33 (615)-1799, Proj. AF-6302, Task 630202,
AMRL TR-65-223-Vol-2
Unclassified report

Descriptors: (*Fluorides, Quantitative analysis), Plants (Botany), Animals, Tissues (Biology), Toxicity, Inorganic compounds, Laboratory equipment, Rats

Methods are described for assaying the fluoride content of ashed samples of plant and animal tissues. Using the Hall method, submicrogram quantities of fluoride were measured and a new procedure was devised to measure fluoride in a 1 to 8 microgram range. Modification of the Weinstein procedure, in which an AutoAnalyzer is used, permitted rapid and semiautomated analysis of samples containing 2.5 to 100 micrograms of fluoride. (Author)

AD-630 594 Fld. 6/20
CFSTI Prices: HC $3.00 MF $0.50
MIAMI VALLEY HOSPITAL DAYTON OHIO DEPT OF RESEARCH
THE METABOLIC ACTIVITY OF INTACT CELL DISPERSATES FROM NORMAL AND OXYGEN INTOXICATED RATS.
Final rept. 1 Feb 63-30 Jun 64,
by Bernard J. Katchman, Marcia L. Collins, and George M. Homer. Dec 65, 56p. Contract AF 33 (657)-9843, Proj. AF-7164, Task 716404,
AMRL TR-65-173
Unclassified report

Descriptors: (*Oxygen, Toxicity), Metabolism, Cells (Biology), Biological assay, Respiration, Nitrogen, Liver, Tissues (Biology), Enzymes, Tissue culture cells, Experimental data, Rats

Methodology for the preparation of intact tissue dispersates was investigated. The metabolic behavior of liver cell dispersates was examined and an assay system suitable to evaluate metabolic activity effected. Metabolic alterations induced in animals exposed to 98 - 99% O2 at 1/3 and at 1 atmosphere have been investigated. Intact liver cell dispersates derived from rats exposed to O2 environments (1 atmosphere) for periods up to death show 40% greater respiratory activity than control rats. In addition, the livers from these O2 intoxicated animals showed decreased mass, decreased cell size, and an increase in total nitrogen. These effects were not time dependent. The only effect noted in animals exposed at 1/3 atmosphere of 98 - 99% O2 was a decrease in liver mass. The significance of these results in O2 intoxication is discussed. (Author)

Field 7-CHEMISTRY

7/1. CHEMICAL ENGINEERING

AD-630 970 See Fld. 7/4

7/2. INORGANIC CHEMISTRY

AD-630 549 Fld. 7/2, 20/9, 11/2
CFSTI Prices: HC $2.00 MF $0.50
RESEARCH INST TEMPLE UNIV PHILADELPHIA PA
PLASMA JET CHEMISTRY.
Final rept., 1 Dec 64-1 Dec 65,
by C. S. Stokes, and J. A. Cahill. Dec 65, 34p. Rept. no. RITU-1965-40,
Contract AF-AFOSR-775-65, Proj. AF-9750, Task 975001,
AFOSR 66-0607
Unclassified report

Descriptors: (*Plasma jets, Chemistry), (*Tungsten compounds, Synthesis (Chemistry)), (*Tantalum compounds, Synthesis (Chemistry)), (*Hydrogen compounds, Sulfides), Heaters, Carbides, Oxides, Methane, Plasma medium, Helium, Refractory materials, Plasma generators, Hydrogen, Sulfur

A plasma jet has been used as the source of energy for producing a high temperature medium for purposes of chemical synthesis. The tungsten carbides (WC and W2C) were formed in a helium plasma jet from either tungsten or tungsten trioxide (WO3) and methane. Similarly the tantalum carbides (TaC and Ta2C) were produced from tantalum and tantalum pentoxide (Ta2O5) with methane in a like manner. Hydrogen sulfide was successfully synthesized from its elements in a helium plasma jet.

AD-630 718 Fld. 7/2, 7/4
ILLINOIS UNIV URBANA DEPT OF CHEMISTRY AND CHEMICAL ENGINEERING
NORMAL COORDINATE ANALYSIS OF PF5, PF2C13, AND PC15,
by Peter C. Van Der Voorn, Keith F. Purcell, and Russell S. Drago. 22 Jun 65, 6p. Contract DA-ARO (D)-31-124-G72 ,NSF-GP-700
AROD 3060:7
Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n10 p3457-62 Nov 15 1965. Copies to DDC users only.

Descriptors: (*Phosphorus compounds, Halides), (*Molecular orbitals, Phosphorus compounds), Fluorides, Chlorides, Wave functions, Chemical bonds, Vibration

Normal coordinate analyses were performed for the series of phosphorus (V) halides--PF5, PF2C13, PCl5. The effect of including interaction force constants was studied in detail. The bond-stretching force constants were interpreted in connection with molecular orbital calculations for these molecules. (Author)

AD-630 721 Fld. 7/2, 7/3
CINCINNATI UNIV OHIO DEPT OF CHEMISTRY
THE PREPARATION AND PROPERTIES OF SOME TETRACOORDINATE BORON COMPOUNDS. THE PSEUDO-METAL ION CONCEPT,
by L. H. Toporcer, R. E. Dessy, and S. I. E. Green. 30 Mar 65, 7p. Contract DA-ARO (D)-31-124-G141,
AROD 3118:9
Unclassified report

Availability: Published in Inorganic Chemistry v4 n11 p1649-55 Nov 1965. Copies to DDC users only.

Descriptors: (*Boron compounds, Complex compounds), (*Chelate compounds, Models (Simulations)), (*Organoboranes, Chelate compounds), Spectrum (Infrared), Spectrum (Visible + ultraviolet), Nuclear magnetic resonance, Polarographic analysis, Molecular structure, Ions, Molecular orbitals, Valence, Synthesis (Chemistry), Chemical properties

The infrared, ultraviolet, H1 and B11 nuclear magnetic resonance spectra, and polarographic behavior of a series of R2B complexes possessing tetrahedral geometry indicate that they and similar derivatives can serve as excellent models with which to study chelate characteristics. The R2B moiety functions as a pseudo-metal ion or atom which permits alteration of total and effective charge without variation in size of the chelate ring and permits placement and surveying of probes to study the electron distribution in the chelates. (Author)

AD-630 795 Fld. 7/2, 7/3
CFSTI Prices: HC $1.60 MF $0.50
MCMASTER UNIV HAMILTON (ONTARIO) DEPT OF CHEMISTRY
SOLUTIONS IN NON-AQUEOUS SOLVENTS.
Final rept.,
by R. J. Gillespie. 1966, 11p. Contract AF-AFOSR-62-21,AF-AFOSR-516-64 Proj. AF-9710, Task 971001,
AFOSR 66-0629
Unclassified report

Descriptors: (*Solvents, Chemical properties), (*Fluorine compounds, Sulfuric acid), (*Antimony compounds, Fluorides), (*Inorganic acids, Solutions), Dehydrogenation, Iodine, Oxidation, Ions, Phenols, Phenyl ethers, Hydrogenation, Hydrogen compounds, Fluorides, Nuclear magnetic resonance, Canada

Fluorosulfuric acid was studied in considerable detail. Some of the more important conclusions were: (1) Fluorosulfuric acid is more acidic than sulfuric acid and it is, therefore, the most highly acidic solvent that has been studied. (2) The autoprotolysis ions H2SO3F (+) and SO3F (-) conduct by a proton-transfer mechanism. (3) Iodine can be oxidized in this solvent to the hitherto unknown I2 (+) ion which gives the blue color formerly attributed to I (+), which does not appear to be stable. (4) Phenol and anisole protonate on the aromatic ring and not on oxygen. A similar study of the HF solvent system was initiated. The behavior of the acid SbF5 was studied in some detail and evidence was obtained for the formation of the new dimeric ion Sb2F11. This work has considerably extended knowledge of highly acidic non-aqueous media and has shown the importance of these solvents in the study of new species, particularly positive ions, that are unstable in more basic media. (Author)

AD-631 067 Fld. 7/2, 11/6
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
PROCEDURES FOR THE CHEMICAL ANALYSIS OF COPPER-BASE ALLOYS.
Final rept.,
by O. R. Gates, and O. Mylting. 10 Mar 66, 15p. Rept. no. NRL-6357,
Proj. RR-007-01-46-5422,
Unclassified report

Descriptors: (*Copper alloys, Chemical analysis), (*Quantitative analysis, Copper alloys), Tin, Chemical precipation, Solvent extraction, Lead, Electrolysis, Iron, Aluminum, Manganese, Nickel, Volumetric analysis, Photometric analysis

Two sets of sequence procedures are presented, each with its own recommended application, that will quickly resolve a great number of analytical problems that may be encountered in the chemical characterization of many common and unusual copper-base alloys. One procedure provides for the precipitation of tin, as metastanni acid, with nitric acid when alloy compositions are such that no appreciable tin-contamination problems arise; the second provides for the retention of tin in solution with hydrofluoric acid when tin-contamination problems are present. By the use of the appropriate procedure, rapid access to the greatest possible amount of analytical information on individual samples, and results comparable in accuracy to standard methods, will be obtained. (Author)

AD-631 093 Fld. 7/2
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
PRESSURE SYNTHESIS OF BORON PHOSPHIDE AND BORON ARSENIDE.
Physical sciences research papers,
by Paul E. Grayson, John T. Buford, and Alton F. Armington. 24 May 65, 6p. Rept. no. AFCRL-66-149,AFCRL-PSRP-202
Proj. AF-5620, Task 562004,
Unclassified report

Availability: Published in Electrochemical Technology v3 n11-12 p338-9 Nov-Dec 1965. Copies to DDC users only.

Descriptors: (*Heat-resistant materials, Boron compounds), (*Boron compounds, Synthesis (Chemistry)), (*Phosphides, Synthesis (Chemistry)), (*Arsenides, Synthesis (Chemistry)), Antimony alloys, Pressure, Crystals, Semiconductors, Optical materials

Boron phosphide and Boron arsenide were prepared under pressure at temperatures above those normally used for their preparation. The use of pressure prevents the formation of Bi3P2 up to 1400C, while the transition between BAs + B13 AD12 was found to be between 800 and 1200C at 75 atmospheres. Attempts to prepare BSb were unsuccessful. (Author)

AD-631 099 Fld. 7/2, 11/6
CFSTI Prices: HC $7.60 MF $0.75
WATERTOWN ARSENAL MASS
RECOMMENDED METHODS OF THE PANEL ON METHODS OF ANALYSIS.
Metallurgical Advisory Committee on Titanium Information, Bull. no. T8, pt. 1.
25 May 55, 74p. Rept. no. WAL-952.4/1-5,
Unclassified report

Descriptors: (*Titanium, Chemical analysis), Volumetric analysis, Colorimetric analysis, Gravimetric analysis, Spectroscopy, Standards, Iron, Chromium, Molybdenum, Vanadium, Tin, Aluminum, Manganese, Nitrogen, Titanium alloys

Contents: Iron, volumetric (hydrogen sulfide separation - dichromate titration); Iron, colorimetric (ortho -phenanthroline - hydroxylamine hydrochloride); Chromium, volumetric (ammonium persulfate oxidation); Chromium, colorimetric (with diphenylcarbazide); Molybdenum, colorimetric (thiocyanate, without extraction); Molybdenum, gravimetric (hydrogen sulfide separation - titration with permanganate); Vanadium, volumetric (ferrous ammonium sulfate titration); Tin, volumetric (iodimetric procedure with fluoboric acid); Aluminum, gravimetric (with 8-hydroxyquinoline); Manganese, volumetric (ammonium persulfate oxidation - sodium arsenite titration); Manganese, colorimetric (potassium periodate oxidation); Nitrogen, volumetric (distillation); Spectrochemical, by solution-spark technique.

AD-630 593 See Fld. 6/20

AD-630 633 See Fld. 7/4

AD-630 678 See Fld. 14/2

AD-630 715 See Fld. 7/4

AD-630 824 See Fld. 20/6

AD-630 829 See Fld. 21/2

AD-630 830 See Fld. 21/2

AD-630 831 See Fld. 21/2

AD-630 832 See Fld. 21/2

AD-630 904 See Fld. 7/4

AD-630 945 See Fld. 7/3

7/3. ORGANIC CHEMISTRY

AD-630 657 Fld. 7/3
FRANK J SEILER RESEARCH LAB AIR FORCE ACADEMY COLO
METHODS OF FORMATION OF PHOSPHORUS-CARBON BONDS: TERTIARY PHOSPHINE OXIDES.
Final rept.,
by Gennady M. Kosolapoff. 22 Mar 65, 6p. Rept. no. SRL-65-0011,
Proj. AF-7903, Task 790300,
Unclassified report

Availability: Published in Journal of the Chemical Society n1222 p6638-9 Nov 1965. Copies to DDC users only.

Descriptors: (*Phosphine oxides, *Chemical bonds), Phosphorus, Carbon, Grignard reactions, Phenyl esters, Organic phosphorus compounds

Grignard reaction was used to prepare tetra-n-octyl - 1,2-ethylenediphosphine dioxide from 2 esters of 1,2-ethylenediphosphonic acid. Removal of phenol, arising from the phenyl esters was difficult. Preparation of tetra-n-butyl- methylenediphosphine dioxide from chloromethyldi- n-butylphosphine oxide with Li or BrMg derivatives of di-n-butylphosphine resulted in low yields. (Author)

AD-630 720 Fld. 7/3
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY
MOLECULAR ASYMMETRY OF OLEFINS. V. RESOLUTION OF CIS,TRANS- 1,5-CYCLOOCTADIENE,
by Arthur C. Cope, Jeffrey K. Hecht, H. W. Johnson, Hannelore Keller, and Hans J. S. Winkler.
6 Nov 65, 3p. Contract DA-ARO (D)-31-124-G404,
AROD 1112:24

Unclassified report

See also AD-621 837.

Availability: Published in Journal of The American Chemical Society v88 n4 p761-3 Feb 20 1966. Copies to DDC users only.

Descriptors: (*Ackenes, *Stereochemistry), (*Monocyclic compounds, *Molecular rotation), Molecular isomerism, Cyclooctane derivatives, Dienes, Complex compounds, Platinum compounds, Benzenes, Amines, Crystalization, Decomposition, Resolution

Resolution of cis,trans- 1,5-cyclooctadiene was accomplished through platinum complexes containing optically active alpha-methylbenzylamine. Fractional crystallization of (+)-trans-dichloro (cis,trans-1,5-cyclooctadiene) (alpha-methylbenzylamine) platinum (II) to constant rotation and decomposition of this complex with sodium cyanide yielded optically active (-)-cis,trans1,5-cyclooctadiene, with a specific rotation (0C, D line) of -152 degrees. (Author)

AD-630 840 Fld. 7/3
CFSTI Prices: HC $1.10 MF $0.50
FLORIDA UNIV GAINESVILLE
GENERATION AND REACTIONS OF CYCLOPROPENYLIDENE.
Final rept. 1 Jan 63-31 Dec 65,
by W. M. Jones. 31 Dec 65, 5p. Contract DA-ARO (D)-31-124-G416, Proj. AROD-4050-C
AROD 4050:8

Unclassified report

Descriptors: (*Cycloalkenes, Synthesis (Chemistry)), Chemical properties, Elimination reactions, Spiro compounds

A method for the synthesis of cyclopropenylidene was developed and some of its reactions were studied. The compound is interesting because it falls into the category of non-benzenoid aromatics. The document briefly summarizes the work and provides a list of publications generated therefrom.

AD-630 945 Fld. 7/3, 7/2, 21/9
CFSTI Prices: HC $8.60 MF $0.75
HERCULES RESEARCH CENTER WILMINGTON DEL
A STUDY OF THE ELECTRONIC CONFIGURATION AND BEHAVIOR OF THE -NF2 GROUP.
Annual rept. no. 3, Mar 65-Feb 66.
15 Apr 66, 83p. Rept. no. HRC-66-1,
Contract DA-31-124-ARO (D)-62,ARPA Order-402-02 Proj. ARO (D)-4136-C

Unclassified report

Descriptors: (*Molecular orbitals, Fluoramines), (*Fluoroamines, Chemical properties), (*Oxidizers, Fluoroamines), (*Nitrogen compounds, Fluorides), Spectra (Infrared), Band spectrum, Chemical bonds, Electrochemistry, Synthesis (Chemistry), Fluorides, Alkali metal compounds, Amines, Bases (Chemistry), Aromatic compounds, Dipole moments, Halogenated hydrocarbons, Cyclohexanes

Contents: Infrared spectroscopy of N-F compounds (methyldifluoramine, perfluoromethyl difluoramine, perfluoro-1,3,5-triaza cyclohexane); Electrochemistry of N-F compounds; The chemistry of NF (generation of NF by the reaction of HNF2 with alkali metal fluorides, generation of NF by the reaction of HNF2 with amines, reaction of HNF2 with anionic bases); Synthesis of aromatic difluoramines; dipole moments of N-F compounds.

AD-631 107 Fld. 7/3
BOSTON UNIV MASS DEPT OF CHEMISTRY
REACTIONS OF ACTIVE NITROGEN WITH ORGANIC SUBSTRATES. III. THE DEGRADATIVE PRODUCTS OF THE REACTION WITH 1,3-BUTADIENE,
by Akira Fujino, Stephen Lunsted, and Norman N.Lichtin. 31 Aug 65, 8p. Contract DA-ARO (D)-31-124-G171,
AROD 3193:1

Unclassified report

Availability: Published in Journal of the American Chemical Society v88 p775-81 1966. Copies to DDC users only.

Descriptors: (*Nitrogen, Chemical reactions), (*Butadienes, Decomposition), Organic nitrogen compounds, Synthesis (Chemistry), Excitation, Glow discharges, Gas chromatography, Spectra (Infrared), Atomic energy levels, Degradation, Nitriles, Aliphatic compounds

Active nitrogen was produced by microwave supported glow discharge and was treated with 1,3-butadiene at autogenous temperature over a wide range of concentrations of reactants and N2. Fourteen 'degradative' products, HCN, C2H6, C2H4, C2H2, C2N2, C3H8, propene, allene, propyne, n-C4H10, cis-2-butene, trans-2-butene, CH3CN, and C2H3CN, were separated by gas chromatography and identified by infrared spectroscopy. Yields of nine of these were determined gas chromatographically under the various reaction conditions. The most salient feature of the data is the low sensitivity of the yield of HCN, the major product, to concentrations of reactants and N2. With the molecular ratio of C4H6 to N (4S) (Determined by NO emission titration) in the range 6.7 to 0.25 the conversion of N to HCN remains essentially constant at approximately 30%. With the ratio 0.12 the yield is 20%. The data appear to support a mechanism according to which the nine products which were studied in detail originate in a rate-determining addition of N (4S) to 1,3-butadiene followed by several parallel modes of unimolecular decomposition. It is suggested that a major portion of reactant N is converted back to N2 via the reactions NH + NH to N2 + H2 and NH + N to N2 + H. (Author)

AD-631 109 Fld. 7/3
FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY
THE PREPARATION AND PROPERTIES OF SOME SALTS OF 2,2-DIPHENYLCYCLOPROPYL DIAZONIUM HYDROXIDE,
by T. K. Tandy Jr., and W. M. Jones. 10 May 65, 7p. Contract DA-ARO (D)-31-124-G416, AROD 4050:7

Unclassified report

Supported in part by NSF.

Availability: Published in Journal of Organic Chemistry v30 p4257-62 Dec 1965. Copies to DDC users only.

Descriptors: (*Organic nitrogen compounds, Chemical properties), Cyclopropanes, Hydroxides, Salts, Synthesis (Chemistry), Alkali metal compounds, Decomposition

In the course of an investigation of the base-induced decomposition of N-nitroso-N- (2,2-diphenylcyclopropyl) urea, several salts of 2,2-diphenylcyclopropyl diazonium hydroxide were isolated. The methods of preparation of this unusual and interesting type of compound are discussed as are their reactions with acylating agents and benzoic acid. (Author)

AD-631 112 Fld. 7/3
FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY
THE MECHANISM OF THE LITHIUM ETHOXIDE INDUCED CONVERSION OF N-NITROSO-N= (2,2-DIPHENYL CYCLOPROPYL) UREA TO 2,2-DIPHENYLDIAZO CYCLOPROPANE,
by W. M. Jones, D. L. Muck, and T. K. Tandy Jr..
6 Jul 65, 7p. Contract DA-ARO (D)-31-124-G416,
AROD 4050:6

Unclassified report

Availability: Published in Journal of the American Chemical Society v88 n1 p68-74 Jan 5 1966. Copies to DDC users only.

Descriptors: (*Organic nitrogen compounds, Synthesis (Chemistry)), Cyclopropanes, Ureides, Lithium compounds, Esters

Historically, the base-induced conversion of N-nitrosoamides, -carbamates, and -ureas to diazoalkanes has been postulated as proceeding via base attack on the carbonyl carbon to give a dioazotate intermediate. In the course of investigations on the lithium ethoxide induced conversion of N-nitroso-N- (2,2-diphenyl cyclopropy) urea to 2,2-diphenyldiazo cyclopropane, two pieces of information were obtained that exclude this path for our reaction. Ethyl carbamate was not formed in this reaction and lithium 2,2-diphenyl cyclopropyldiazotate, the normally presumed intermediate, was synthesized and found to be totally unaffected by reaction conditions that lead to efficient conversion of the nitrosourea to the diazocyclopropane. An alternate mechanism involving attack of the base on the nitroso nitrogen is postulated. The pyrrolidine-induced decomposition of the nitrosourea also appears to proceed by this mechanism. (Author)

AD-630 715 See Fld. 7/4

AD-630 721 See Fld. 7/2

AD-630 795 See Fld. 7/2

AD-630 84(See Fld. 6/8

AD-630 855 See Fld. 6/8

AD-630 908 See Fld. 11/3

AD-630 970 See Fld. 7/4

AD-631 110 See Fld. 7/4

AD-631 111 See Fld. 7/5

7/4. PHYSICAL CHEMISTRY

AD-630 616 Fld. 7/4, 14/2
LITTLE (ARTHUR D) INC CAMBRIDGE MASS
NANOSECOND BACKGROUND SOURCE FOR FLASH PHOTOLYSIS.
Physical sciences research papers,
by Heinz Fischer, Emma Duchane, and Alfred Buchler. 19 Apr 65, 7p. Contract AF 19 (628)-

AFCRL PSRP-198 ,AFCRL 66-123
Unclassified report

Availability: Published in The Journal of the Optical Society of America v55 n10 p1275-7 Oct 1965. Copies to DDC users only.

Descriptors: (*Photolysis, Light pulses), (*Lightpulses, Timing devices), Light, Sources, Spectroscopy, Laboratory equipment

A single-flash continuous spectrum producing more than adequate photographic density and having maximum intensity in the near ultraviolet is obtained in an argon-air mixture at elevated pressure by means of a light source of 20-30 nsec halfwidth. Tails of the light pulse are reduced by a distributed resistor which decreases the ringing of the current. The resistor is plated on the capacitor transmission line of the source. Absorption spectra show the usefulness of this source as a nanosecond spectroscopic background source for flash photolysis. (Author)

AD-630 633 Fld. 7/4, 7/2
CFSTI Prices: HC $1.00 MF $0.50
FULMER RESEARCH INST LTD STOKE POGES (ENGLAND)
HEATS OF FORMATION OF COMPOUNDS CONTAINING B, BE, AL AND LI. I. HEATS OF FORMATION OF ALPHA'-BERYLLIUM CHLORIDE AND ALPHA- AND BETA-BERYLLIUM NITRIDE,
by P. Gross, C. Hayman, P. D. Greene, and J. T. Bingham. Sep 64, 25p. Rept. no. Scientific-1, Contract AF 61 (052)-447,
Unclassified report

Descriptors: (*Beryllium compounds, Heat of formation), (*Heat of formation, Beryllium compounds), (*Heat of reaction, Beryllium compounds), Chlorides, Nitrides, Thermochemistry, Calorimetry, Boron compounds, Aluminum compounds, Lithium compounds, Great Britain

The heats of the following reactions were determined calorimetrically at one atmosphere pressure and 25C. Be (c) + Cl2 (g) to alpha'-BeCl2 (c): -117.1 plus or minus 0.4 Kcal/mole. Alpha-Be3N2 (c) + 3Cl2 (g) to 3alpha' -BeCl2 (c) + N2 (g): -210.3 plus or minus 1.1 Kcal/mole. Beta-Be3N2 (c) + 3Cl2 (g) to 3alpha'-BeCl2 (c) + N2 (g): -214.6 plus or minus 0.8 Kcal/mole. 3Be (c) + 2NH3 (g) to alpha-Be3N2 (c) + 3H2 (g): -118.4 plus or minus 0.3 Kcal/mole. These data and the value for the heat of formation of ammonia (-11.04 Kcal/mole) enable the following standard heats of formation to be derived. Alpha'-BeCl2: -117.1 plus or minus 0.4 Kcal/mole. Alpha-Be3N2: -141.0 plus or minus 1.6 Kcal/mole, or -140.5 plus or minus 0.3 Kcal/mole. Beta-Be3N2: -136.7 plus or minus 1.5 Kcal/mole. (Author)

AD-630 665 Fld. 7/4, 20/4
CFSTI Prices: HC $2.60 MF $0.50
UPPSALA UNIV (SWEDEN) INST OF PHYSICAL CHEMISTRY
NON-NEWTONIAN FLOW OF DILUTE POLYMETHACRYLIC ACID SOLUTIONS AT DIFFERENT DEGREES OF NEUTRALIZATION AND IONIC STRENGTHS.
Technical summary rept. Jan 64-Jan 65,
by Ragnar Stromberg. Jan 66, 25p. Contract AF 61 (052)-392, Proj. AF-7342, Task 734203, AFML TR-65-276
Unclassified report

Descriptors: (*Acrylic resins, Fluid flow), Solutions, Viscosity, Neutralization, Ionization, Electrolytes, Rheology, Sweden

A careful experimental study of the gradient dependence of viscosity for dilute solutions of polymethacrylic acid (M = 112,000) was performed. Measurements were made at six degrees of neutralization between 10 and 90 percent and ionic strengths between 0.0005 M and 0.005 M. The velocity gradient range covered is 2 - 71,000/sec. Isoionic dilution was employed to permit linear extrapolation to zero concentration. As expected the gradient dependence is most pronounced when the polymer is highly charged and the ionic strength is low. The experimental results are mainly viewed in the light of theories concerning the rigidity of the macromolecular coil. (Author)

AD-630 715 Fld. 7/4, 7/2, 7/3
SAN DIEGO STATE COLL CALIF DEPT OF CHEMISTRY
HEATS OF FORMATION OF SILICON TETRACHLORIDE, DIMETHYLDICHLOROSILANE AND DIPHENYLDICHLOROSILANE,
by M. A. Ring, H. E. O'Neal, A. H. Kadhim, and Fred Jappe. 18 May 65, 7p. Contract DA-ARO (D)-31-124-G465,
AROD 4192:3
Unclassified report

Availability: Published in Journal of Organometallic Chemistry v5 p124-9 1966. Copies to DDC users only.

Descriptors: (*Silicon compounds, *Heat of formation), (*Silanes, Heat of formation), Thermochemistry, Chlorine compounds, Chlorides, Chemical bonds, Enthalpy, Calorimetric analysis, Hydrolysis, Heat of reaction

Heats of hydrolysis in aqueous solutions were obtained for the following chlorosilanes: SiCl4 (-79.75 plus or minus 0.14 kcal/mole), (C6H5)2SiCl2 (-31.64 plus or minus 0.46 kcal/mole), C6H5SiCl3 (-55.07 plus or minus 0.17 kcal/mole), (CH3)2SiCl2 (-32.09 plus or minus 0.03 kcal/mole) and (CH3)3SiCl (-12.42 plus or minus 0.19 kcal/mole). From these data heats of formation were calculated for the following gaseous chlorosilanes: SiCl4 (-153.7 kcal/mole), (CH3)2SiCl2 (-108.4 kcal/mole) and (C6H5)2SiCl2 (-52.2 kcal/mole). A change in silicon -chlorine bond strength with degree of chlorination is discussed. (Author)

AD-630 717 Fld. 7/4, 3/2
INSTITUTE FOR MOLECULAR PHYSICS UNIV OF MARYLAND COLLEGE PARK
FRANCK-CONDON FACTORS FOR OBSERVED TRANSITIONS IN N2 ABOVE 6 EV,
by William Benesch, Joseph T. Vanderslice, S. G. Tilford, and P. G. Wilkinson. 1 Jun 65, 18p. Contract DA-ARO (D)-31-124-G466 ,NSG-398
AROD 4251:7
Unclassified report

Availability: Published in The Astrophysical Journal v143 n1 p236-52 Jan 1966. Copies to DDC users only.

Descriptors: (*Nitrogen, *Electron transitions), (*Band spectrum, Intensity), (*Wave functions, Nitrogen), Integration, Molecular energy levels, Tables

Numerov integration of the one-dimensional Schroedinger equation was used to obtain wave functions and Franck-Condon factors for states and transitions in molecular nitrogen based on a model comprising an RKR potential function generated directly from the measured data. Tables of Franck-Condon factors and band origins are presented. (Author)

AD-630 803 Fld. 7/4, 20/8
CFSTI Prices: HC $8.60 MF $0.75
NEW YORK UNIV N Y
CONFERENCE ON THE PHYSICS OF ELECTRONIC AND ATOMIC COLLISIONS, JANUARY 27 AND 28, 1958.
Program and abstracts of papers.
1958, 85p.
Unclassified report

Jointly sponsored by ONR and AFOSR.

Descriptors: (*Electron beams, Scattering), (*Atoms, Electron bombardment), (*Molecular beams, Symposia), Elastic scattering, Inelastic scattering, Ion bombardment, Photons, Exchange reactions, Atomic energy levels, Transport properties

Abstracts are included of papers dealing with elastic and inelastic electron-atom scattering, atom-atom and atom-ion collisions, photon-atom impacts, charge exchange, and special topics.

AD-630 904 Fld. 7/4, 4/1, 7/2, 7/5
CFSTI Prices: HC $2.00 MF $0.50
IIT RESEARCH INST CHICAGO ILL
INVESTIGATION OF CHARGE NEUTRALIZATION PHENOMENA BETWEEN POSITIVE AND NEGATIVE IONS.
Final rept. 20 May 63-30 Dec 65,
by Carsten M. Haaland. Dec 65, 46p. Rept. no. T6033,
Contract AF 19 (628)-3252, Proj. AF-7673, AFCRL 66-159
Unclassified report

Descriptors: (*Upper atmosphere, Chemical reactions), (*Recombination reactions, Reaction kinetics), (*Nitrogen compounds, Reaction kinetics), (*Oxygen, Reaction kinetics), Ions, Neutralization, Oxides, Plasma medium, Magnetic pinch, Gas ionization, Photochemistry, Photoelectrons, Mass spectroscopy, Spectrum analyzers

The report describes a technique for the measuring positive ion - negative ion two body reaction rates, which was developed for measuring the reaction rates of NO (+) with O2 (-). Thermal not ions are produced by photoionization of NO and photoelectrons produced in separate chamber containing oxygen are allowed to attach to the neutral gas to produce O2 (-). The two species are allowed to react by removal of a gas actuated shutter dividing the two chambers. The reactant period by actuation of a second shutter which separates the reaction chamber from a time of flight mass spectrometer. The time of flight mass spectrometer was modified to provide a 100 kc/sec sample rate, a theta pinch lyman-alpha light source was developed, and the shutter speeds of 10000 cm/sec were attained. (Author)

AD-630 917 Fld. 7/4
CFSTI Prices: HC $1.60 MF $0.50
BRANDEIS UNIV WALTHAM MASS DEPT OF CHEMISTRY
HEATS OF SOLUTION OF ALKALI METALS IN AMMONIA.
Technical rept.,
by Thomas R. Tuttle Jr., Charles Guttman, and Sidney Golden. 15 Mar 66, 17p. Rept. no. TR-16,
Contract Nonr-1677 (01), Proj. NR-051-362,
Unclassified report

Descriptors: (*Alkali metals, *Heat of solution), (*Potassium, Heat of solution), (*Sodium, Heat of solution), (*Ammonia, Solutions), Thermochemistry, Oxidation-reduction reactions, Chemical equilibrium, Enthalpy, Nuclear spins

The heats of solution of sodium and potassium in liquid ammonia are examined in terms of the redox model which has been proposed for the composition of these solutions. The heats of solution are shown to vary in an essentially linear manner with the spin paramagnetic susceptibility of the solutions, as expected from the model. Analysis of the data yields enthalpy changes for the redox equilibrium M (+) + 2S (-) reversibly yields M (-) + 2S, which are in reasonably good agreement with those obtained from the temperature variation of spin paramagnetic susceptibility. A temperature-dependent enthalpy is indicated for the redox equilibrium. (Author)

AD-630 934 Fld. 7/4, 20/9
QUEEN'S UNIV BELFAST (NORTHERN IRELAND) DEPT OF APPLIED MATHEMATICS

THE IONIZATION OF INERT GAS ATOMS BY ELECTRON AND PROTON IMPACT AT HIGH ENERGIES,
by A. E. Kingston, B. L. Schram, and F. J. de Heer. 22 Oct 65, 3p.

Unclassified report

Prepared in cooperation with FOM-Laboratory for Mass Separation, Amsterdam (Netherlands).

Availability: Published in Proceedings of the Physical Society v86 pt6 n554 p1374-6 1965. Copies to DDC users only.

Descriptors: (*Gas ionization, Probability), (*Electron bombardment, Gas ionization), (*Proton bombardment, Gas ionization), Equations, Helium group gases, Electron bombardment, Great Britain, Netherlands

At large energies E the electron ionization cross section Q of an inert gas atom may be written as QE = A log E+B. Renewed analysis of Schram's ionization measurements leads to the conclusion that there is good agreement between Kingston's calculated A values and the experimental A values. (Author)

AD-630 970 Fld. 7/4, 7/3, 7/1
CFSTI Prices: HC $1.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
USE OF COARSE POROUS GLASS IN GAS-ADSORPTION CHROMATOGRAPHY FOR THE SEPARATION OF LIQUID HYDROCARBONS,
by S. P. Zhdanov, A. V. Kiselev, and Ya. I. Yashin. 21 Jan 66, 18p. Rept. no. FTD-TT-65-1487, TT 66-60986

Unclassified report

Unedited rough draft trans. of Neftekhimiya (USSR) v3 n3 p417-24 1963.

Descriptors: (*Gas chromatography, *Glass), (*Hydrocarbons, Gas chromatography), (*Alkanes, Adsorption), (*Aromatic compounds, Adsorption), Porous materials, Separation, Silicon, Thermochemistry, Benzenes, Alkenes, Molecular orbitals, Calorimetric analysis, USSR

The possibility is pointed out of using coarse porous glass for the separation of normal alkanes and aromatic hydrocarbons with boiling temperatures up to 150C by the method of gas-adsorption chromatography. A study of the dependence of the effectiveness of the column with coarse porous glass on the linear speed of the gas-carrier indicated the possible use of such columns at great linear speeds. From the chromatograms taken at various temperatures, the adsorption heats of a series of hydrocarbons on the hydroxylated surface of silicon were determined. The adsorption heats of normal alkanes and normal alkyl benzenes increase linearly with the increase in the number of carbon atoms in the molecule. The adsorption heat of ethylene is greater than that of benzene, and that of alkyl benzene is greater than the corresponding n-alkanes because of the specific interaction, primarily, of the pi-electron bonds with the hydroxyl groups of the surface. The values determined from the chromatograms of heat adsorption were close to those obtained calorimetrically. (Author)

AD-630 997 Fld. 7/4, 4/1
CFSTI Prices: HC $3.00 MF $0.50
RAND CORP SANTA MONICA CALIF
POTENTIAL ENERGY CURVES FOR N2, NO, O2, AND CORRESPONDING IONS,
by F. R. Gilmore. Apr 66, 50p. Rept. no. RM-4034-1-PR,
Contract AF 49 (638)-1700,

Unclassified report

Descriptors: (*Nitrogen, Potential energy), (*Oxygen, Potential energy), (*Nitrogen compounds, Potential energy), (*Oxides, Potential energy), Molecular energy levels, Ions, Spectroscopy, Quantum mechanics, Graphics, Ionosphere, Nuclear explosions, Ionization trails

Potential energy curves for the observed electronic states of N2, N2 (+), NO, NO (+), O2 and O2 (+) were calculated from published spectroscopic data by a numerical modification of the Rydberg-Klein method. Potential energy curves for a number of predicted but unobserved states of these molecules, and of the ground states of N2 (-) (unstable), NO (-) and O2 (-), were estimated with the help of simple theoretical considerations, published quantum-mechanical calculations, and indirect experimental evidence. The results are presented graphically. (Author)

AD-631 017 Fld. 7/4
NATIONAL BUREAU OF STANDARDS WASHINGTON D C
ATOMIC LIFETIMES IN NEON I,
by Jules Z. Klose. 17 May 65, 7p.

Unclassified report

Supported in part by ARPA.

Availability: Published in The Physical Review v141 n1 p181-6 Jan 1966. Copies to DDC users only.

Descriptors: (*Neon, *Atomic energy levels), Electron transitions, Probability, Helium, Line spectrum

Mean lives of a number of electronically excited atomic levels in Ne I were determined using a method of delayed coincidence. Following a detailed description of the experimental procedure and a discussion of a series of trial runs in He I, the measured values of the mean lives of the 2p1 through 2p9, 3p1, 3p10, and 4d1' (Paschen notation) levels in neutral neon are given. These lifetimes, determined from transitions with associated wavelengths extending from approx. 3400 to approx. 6400 A, ranged in value from approx. 14 to approx. 500 nsec. The lifetimes were estimated to contain possible systematic errors varying from 5 to 20% and are presented in comparison with corresponding results of other workers. (Author)

AD-631 092 Fld. 7/4
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
PRESSURE-BROADENED WING CONTRIBUTIONS TO THE NO FUNDAMENTAL BAND INTENSITY.
Physical sciences research papers,
by S. A. Clough, B. Schurin, and F. X. Kneizys. 7 Jun 65, 5p. Rept. no. AFCRL-66-133,AFCRL-PSRP-200
Proj. AF-7670, Task 767003,

Unclassified report

Availability: Published in Journal of Chemical Physics v43 n9 p3410-11 1 Nov 1965. Copies to DDC users only.

Descriptors: (*Nitrogen compounds, Monoxides), (*Band spectrum, Intensity), Pressure, Electron transitions

A study was performed to help resolve the disagreement among several workers of the value of the band intensity for the fundamental of nitrous oxide. It is shown that the observations obtained by Schurin and Clough and reported in a previous paper are in good agreement with a calculated contour of pressure broadened NO. (Author)

AD-631 098 Fld. 7/4
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF PHYSICS
SPECTRAL EMISSIVITY OF WATER VAPOR AT 1200K,
by U. P. Oppenheim, and A. Goldman. 1965, 6p.
Contract AF-EOAR-84-65,
AFOSR 66-0347

Unclassified report

Availability: Published in Symposium International (10th) on Combustion, Combustion Inst. p185-188 1965. Copies to DDC users only.

Descriptors: (*Water vapor, Spectra (Infrared)), Band spectrum, Emissivity, Molecular spectroscopy, High-temperature research, Pressure, Israel

Results are presented of quantitative spectroscopic studies on pure water vapor in the 1.9- and 2.7-micron regions. Use was made of quartz absorption cells of various lengths, which were heated in an electrical furnace to a temperature of 1200K. By applying the 'statistical' spectral band model at every frequency in each band, it was possible to correlate the observed spectral emissivities with the optical path length and the pressure of the gas. From emissivity measurements in the "linear region" of the 2.7-micron band it was possible to measure the absolute intensity of this band, which was found to be 198/sq cm/atm at 300K. (Author)

AD-631 110 Fld. 7/4, 20/12, 7/3
UTAH UNIV SALT LAKE CITY INST FOR THE STUDY OF RATE PROCESSES
ELECTRICAL PROPERTIES OF SOME PORPHYRINS UNDER HIGH PRESSURE,
by D. W. Wood, T. N. Andersen, and H. Eyring. 17 Jun 65, 7p. Contract DA-ARO (D)-31-124-G618,
AROD 2759:9

Unclassified report

*Availability: Published in *Journal of Physical Chemistry v70 n2 p360-6 Feb 1966. Copies to DDC users only.*

Descriptors: (*Semiconductors, Porphrins), (*Porphrins, Electrical conductance), Chelate compounds, Hemoglobin, Pressure, Resistance (Electrical), Heat of activation, Carriers (Semiconductors), Reaction kinetics, Organic pigments, Compressive properties

The electrical conductivities of protoporphyrin, hematoporphyrin free base, hematoporphyrin dihydrochloride, copper protoporphyrin, hemin, hematin, etioporphyrin, and vanadyl etioporphyrin were measured at the static pressures of 1-90 kbars and at temperatures of 25 to 100C. The study was made in a Bridgman anvil press. A resistivity reduction of as great as five orders of magnitude was observed for the bridged compounds (hemin, hematin, and vanadyl etioporphyrin) over the pressure range, and a corresponding activation energy decrease by more than half was observed in the same pressure range. The resistivity vs. pressure curves for these compounds showed a change in slope, and the activation energy vs. pressure curves showed a discontinuity near 25 kbars. The resistivities and activation energies of the nonbridged compounds were essentially pressure independent. A hole-conduction mechanism independent of pressure for the nonbridged porphyrins accounts for the observed results. (Author)

AD-631 129 Fld. 7/4, 20/4
POLYTECHNIC INST OF BROOKLYN FREEPORT N Y
DISSOCIATED LAMINAR BOUNDARY LAYERS WITH HETEROGENEOUS RECOMBINATION,
by Herbert Fox, and Paul A. Libby. 4 Jun 65, 10p. Rept. no. 835,
Contract AF-AFOSR-62-409,
AFOSR 66-0625

Unclassified report

Portions submitted by Herbert Fox (Doctoral thesis), in partial fulfillment of requirements for PhD. 1965.

Availability: Published in Physics of Liquid v9 n1 p33-40 Jan 1966. Copies to DDC users only.

Descriptors: (*Laminar boundary layer, *Recombination reactions), Dissociation, Gas

flow, Heat transfer, Catalysis, Surfaces, Mathematical analysis

A method of systematically treating a variety of laminar boundary layers with surface reaction is presented. With the assumption of simplified transport properties, the solution for the surface concentration in a reaction of any order and with any distribution of surface catalyticity is shown to be given by an integral equation which is amenable to numerical treatment by iteration techniques. The nonlinear boundary condition is shown to be readily handled by the iterative procedure. Certain special cases are discussed. In addition, it is shown how the first-order effects of deviations from simplified transport properties can be readily computed again in terms of integral equations. In the concluding section several illustrative applications of the analysis are presented. (Author)

AD-631 154 Fld. 7/4
MASSACHUSETTS INST OF TECH CAMBRIDGE AEROPHYSICS LAB
AXISYMMETRIC, LAMINAR, BINARY SHEAR LAYER WITH THERMAL DIFFUSION AND DIFFUSION-THERMO EFFECTS.
Revised ed.,
by Kuei-Yuan Chien. 1 Jun 65, 10p. Contract AF-AFOSR-641-64,
AFOSR 66-0570
Unclassified report

Revision of manuscript submitted 29 Mar 65.

Availability: Published in International Journal Heat and Mass Transfer v8 p1507-13 1965. Copies to DDC users only.

Descriptors: (*Thermal diffusion separation, *Gases), Transport properties, Jets, Helium, Nitrogen, Kinetic theory, Mathematical analysis

Consideration is given to the thermal separation of components across the shear layer between a cold jet mixture (of helium and nitrogen) and a hot ambient gas, both initially at the same concentration levels. An asymptotic steady state solution is obtained assuming the layer to be thin relative to the jet radius. As a consequence of small inhomogeneity the momentum equation may be decoupled from energy considerations and a priori known velocity profiles result with the customary assumption of constant product of density and viscosity. Iterative integration of the concentration and energy relations is completed on the basis of the steady state condition of zero mass transport across the dividing streamline using similarity coordinates. Reasonable agreement with available experimental data results from use of the modified hard sphere model for the thermal diffusion ratio. (Author)

AD-630 550 See Fld. 20/13

AD-630 571 See Fld. 18/2

AD-630 580 See Fld. 20/8

AD-630 609 See Fld. 13/8

AD-630 629 See Fld. 20/4

AD-630 634 See Fld. 21/2

AD-630 681 See Fld. 20/12

AD-630 714 See Fld. 20/8

AD-630 718 See Fld. 7/2

AD-630 744 See Fld. 11/1

AD-630 829 See Fld. 21/2

AD-630 830 See Fld. 21/2

AD-630 831 See Fld. 21/2

AD-630 832 See Fld. 21/2

AD-630 863 See Fld. 20/12

AD-630 910 See Fld. 20/4

AD-630 914 See Fld. 11/2

AD-630 980 See Fld. 11/2

AD-631 007 See Fld. 20/13

AD-631 010 See Fld. 20/12

AD-631 104 See Fld. 21/2

7/5. RADIO AND RADIATION CHEMISTRY

AD-630 891 Fld. 7/5, 11/9
CFSTI Prices: HC $2.00 MF $0.50
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
A STUDY OF THE FAST NEUTRON-INDUCED GELATION OF DIETHYLENE GLYCOL DIMETHACRYLATE USING 14-MEV NEUTRONS.
Memorandum rept.,
by John A. Devanney. Jun 65, 43p. Rept. no. MR-1686,
Proj. RDT/E-1N022601A088,
Unclassified report

Descriptors: (*Neutron bombardment, Gels), (*Vinyl plastics, Polymerization), (*Acrylic resins, Polymerization), (*Glycols, Neutron bombardment), (*Fatty acidesters, Neutron bombardment), Fast neutrons, Free radicals, Crosslinking (Chemistry), X-rays, Radiation chemistry, Dosage, Neutron flux, Neutron absorption, Plasticizers

The vinyl monomer investigated polymerized via a free radical mechanism. A comparison of the effects of neutrons and x-rays is performed on the basis of radiation induced cross-linking on monomer molecules as exhibited by the production of a gel as an index. Neutron fluxes were measured using threshold foils and absorbed doses calculated using first collision approximations. (Author)

AD-631 111 Fld. 7/5, 7/3
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
CHEMILUMINESCENCE OF HYDROCARBON OXIDATION,
by Gerald Lundeen, and Robert Livingston. 23 Apr 65, 13p. Contract DA-ARO (D)-31-124-G738,
AROD 2397:9
Unclassified report

Availability: Published in Photochemistry and Photobiology v4 p1085-96 1965. Copies to DDC users only.

Descriptors: (*Hydrocarbons, *Chemiluminescence), Oxidation, Naphthalenes, Benzenes, Peroxides, Anthracines, Decomposition, Reaction kinetics

The paper is a report of an experimental study of the luminescence which accompanies autoxidation, spontaneous and induced by the decomposition of benzoyl peroxide, of tetralin and amyl benzene. Anthracene, 9,10-diphenyl anthracene and 9,10-dibromoanthracene were used as intensifiers of luminescence. (Author)

AD-630 904 See Fld. 7/4

AD-630 908 See Fld. 11/3

Field 8-EARTH SCIENCES AND OCEANOGRAPHY

8/1. BIOLOGICAL OCEANOGRAPHY

AD-630 903 Fld. 8/1
CFSTI Prices:MF $0.75
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
THE DISTRIBUTION AND CHARACTERISTICS OF SURFACE BIOLUMINESCENCE IN THE OCEANS.
Final technical rept.,
by Robert F. Staples. Mar 66, 50p. Rept. no. TR-184,
Unclassified report

Availability: Available from U. S. Naval Oceanographic Office, Washington, D. C., 20390. HC $0.90.

Descriptors: (*Plankton, *Luminescence), Marine biology, Oceans, Phosphorescence, Distribution, Maps, Oceanographic data, Periodic variations, Surfaces

Approximately 3,000 reports of bioluminescent displays on file at the U. S. Naval Oceanographic Office are charted by three-month periods. In addition, various aspects of bioluminescence, bioluminescent organisms, seasonal and geographic distribution, and displays are discussed. A separate chart and a discussion of the puzzling phenomena of the 'phosphorescent wheel' and 'wave' displays are included. (Author)

AD-631 056 Fld. 8/1, 17/10
CFSTI Prices: HC $1.60 MF $0.50
MICHIGAN UNIV ANN ARBOR INST OF SCIENCE AND TECHNOLOGY
VESIAC MONTHLY BULLETIN OF VELA UNIFORM RESEARCH PUBLICATIONS.
15 Mar 66, 19p. Rept. no. VESIAC Bull-38,
Unclassified report

See also AD-629 264.

Descriptors: (*Seismology, Bibliographies), Periodicals, Scientific research

AD-631 078 Fld. 8/1, 11/5, 11/6, 11/9, +
CFSTI Prices: HC $3.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
DEEP-OCEAN BIODETERIORATION OF MATERIALS -PART III. THREE YEARS AT 5,300 FEET.
Technical rept. Mar 62-Jun 65,
by James S. Muraoka. Feb 66, 53p. Rept. no. TR-428,
Proj. Y-R011-01-01-042,
Unclassified report

Descriptors: (*Marine biology, Fouling), (*Materials, Degradation), (*Fouling, Materials), Oceanology, Oceanographic equipment, Corrosion, Aquatic animals, Marine borers, Worms, Sea water, Sedimentation, Growth, Rock (Geology), Metals, Plastics, Cordage, Coatings, Rubber, Butyl rubber, Wood, Bacteria, Test methods, Test equipment, Pacific Ocean

The report covers data obtained after exposing 1,318 test specimens of 316 different materials for 35 months on the Pacific Ocean floor at a depth of 5,300 feet. The materials were attached to a Submersible Test Unit (STU). The STU was retrieved in February 1965 and returned to the Laboratory for tests and analyses. Hydroid growths were found on all the test specimens placed on the STU. A few species of tube worms were found attached to metals, plastics, and coated test specimens. Most of the plastics and all the rope materials were covered with bacterial slime growth. Cotton and Manila rope specimens were severely deteriorated by bacterial action. Wood panels, plas-

tics, and Manila ropes were attacked by marine borers. Metals, natural and butyl rubber, and certain plastic materials were not affected. (Author)

AD-630 789 See Fld. 8/6

8/2. CARTOGRAPHY

AD-630 766 Fld. 8/2, 9/2
CFSTI Prices: HC $1.60 MF $0.50
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
NOTE ON COMPUTER PROGRAM FOR THE SINGLE CAMERA ORIENTATION CASE.
Memo. rept.,
by Lila M. Butler. Sep 65, 19p. Rept. no. BRL-MR-1702,
Proj. 1L013001A91A

Unclassified report

Descriptors: (*Photogrammetry, *Programming (Computers)), Cameras, Position finding, Numerical analysis, Flow charting

This report presents an addendum to Ballistic Research Laboratories Report No. 1268, Computer Program for the 'SINGLE CAMERA ORIENTATION' case of the GENERAL PROBLEM OF PHOTOGRAMMETRY. A new method for the computation of the mean errors of unit weight for the plate and point coordinates as developed by H. H. Schmid is the main modification to the existing method of computation. (Author)

AD-631 072 Fld. 8/2, 14/5
CFSTI Prices: HC $13.60 MF $1.00
CORNELL UNIV ITHACA N Y DEPT OF SURVEYING
ANALYTIC AEROTRIANGULATION: TRIPLETS AND SUB-BLOCKS INCLUDING USE OF AUXILIARY DATA.
Final technical rept., phase 3, 1 Mar 64-30 Sep 65,
by James M. Anderson, Richard L. Ealum, and Arthur J. McNair. 30 Sep 65, 140p. Contract DA-44-009-AMC-502 (X), Proj. DA-4A-623501A8522,

Unclassified report

Descriptors: (*Aerial photography, *Geodesics), Feasibility studies, Photogrammetry, Programming (Computers)

The feasibility of using triplets and sub-blocks as opposed to the conventional stereopairs is investigated. A procedure for triplet aerotriangulation consisting of: (1) triplet relative orientation; (2) triplet assembly; and (3) transformation to ground control has been developed, programmed and tested using FORTRAN language and proven suitable for a 10k computer. The program uses the coplanarity equation for the condition for relative orientation. Both fictitious and real photographic data were tested. Triplets are proven to be much stronger than conventional stereopairs for extending control. A procedure for ninephotograph sub-block aerotriangulation consisting of: (1) sub-block relative orientation and coordinate computation; (2) sub-block assembly for a pair of sub-blocks; and (3) transformation to ground control has been developed, programmed and tested using FORTRAN language with fictitious photography on a 32k electronic computer. The program is based on the colinearity equation and also will perform aerotriangulation of strips using triplets. It requires 60 percent side lap of strips and provides many advantages over a general block triangulation solution. Theoretical developments are presented which allow incorporation of auxiliary exposure station data in the sub-block relative orientation. (Author)

AD-630 781 See Fld. 8/5

AD-631 008 See Fld. 17/7

8/3. DYNAMIC OCEANOGRAPHY

AD-630 741 Fld. 8/3, 8/10, 14/2
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
AN ABYSSAL AUTOMATIC TURBULENCE METER, AN INSTRUMENT FOR THE REGISTRATION OF TURBULENT FLUCTUATIONS OF VELOCITY AND TEMPERATURE IN THE OCEAN,
by A. A. Kolesnikov, N. A. Panteleev, V. D. Pisarei, and P. V. Vakulov. 1966, 14p. Rept. no. Translation-985,
TT 66-60931

Unclassified report

Trans. of Okeanologiya (USSR) n5 p911-21 1963.

Descriptors: (*Oceanographic equipment, USSR), (*Turbulence, Oceanology), Deep submergence, Underwater equipment, Telemeter systems, Electronic recording systems, Oceanographic data

The abyssal, self contained turbulence meter is a cylindrical steel container which is placed vertically, and which contains a special frame to which the sensors are fastened. The container is equipped with a stabilizer for setting the entire instrument according to the current. (Author)

AD-631 014 Fld. 8/3, 4/2, 20/4
CFSTI Prices: HC $1.60 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
ON THE CALCULATION OF WIND WAVE ELEMENTS IN THE CASE OF A VARIABLE WIND,
by I. S. Brovikov. 29 Mar 66, 12p. Rept. no. TG-230-T471,
Contract NOw-62-0604-c,
TT 66-60998

Unclassified report

Trans. of Gosudarstvennyi Okeanograficheskii Institut. Trudy (USSR) n38 p3-10 1957.

Descriptors: (*Ocean waves, *Wind), Marine meteorology, Water waves, Hydrodynamics, Mathematical analysis, USSR

In computing the elements of wind waves for variable winds it is assumed that the wind energy transmitted by a wave surface on a sea is proportional to the square of the wind velocity. A part of the energy maintains wind waves and their development, another part is dissipated because of viscosity and turbulent motion. The computation of energy dispersion is determined by means of a formula of the semi-empirical theory of turbulence. From the intensity of dissipated energy and the expression for wind energy transmitted by the wave surface the energy balance equation is formulated and solved. (Author)

AD-631 155 Fld. 8/3
MASSACHUSETTS INST OF TECH CAMBRIDGE
A STUDY OF THE TIME DEPENDENT OCEAN CIRCULATION.
Revised ed.,
by Joseph Pedlosky. 18 Nov 64, 7p. Contract AF-AFOSR-492-64,
AFOSR 66-0243

Unclassified report

Revision of manuscript submitted 2 Sep 64.

Availability: Published in Journal of the Atmospheric Sciences v22 n3 p267-72 May 1965. Copies to DDC users only.

Descriptors: (*Ocean currents, *Wind), Oceans, Marine geophysics, Fluid mechanics, Mathematical models

The response of a simple bounded-ocean model to a fluctuating wind stress is studied. Both the linear response and the resulting steady non-linear circulations are computed. The results of this analysis show that the structures of the steady and fluctuating ocean circulations are strongly dependent on the frequency of the forcing. (Author)

8/4. GEOCHEMISTRY

AD-630 973 See Fld. 6/1

8/5. GEODESY

AD-630 781 Fld. 8/5, 8/2, 22/2
CFSTI Prices: HC $7.60 MF $0.75
BALLISTIC RESEARCH LABS ABERDEEN PROVING GROUND MD
ERROR STUDY OF A WORLDWIDE SATELLITE TRIANGULATION NET,
by Edna L. Lortie. Jan 66, 73p. Rept. no. 1310,
Proj. RDT/E-1L013001A91A

Unclassified report

Descriptors: (*Geodesics, Satellite tracking systems), (*Satellite tracking systems, Geodesics), (*Photogrammetry, Geodesics), Satellites (Artificial), Position finding, Astronomical geodesics, Errors

A proposed three-dimensional geodetic reference system, consisting of 36 stations so situated on the surface of the earth as to form a closed system of approximate equilateral triangles surrounding the globe, is studied in an attempt to find out to what degree of accuracy the station positions can be determined when triangulating the corresponding station coordinates by photogrammetric techniques. The polyhedron of the spatially oriented triangles is formed by photographing a high altitude satellite against the star background. The triangulation method depends on applying analytical photogrammetric techniques to satellite observations where the satellite serves as a high altitude auxiliary triangulation target point. Numerical analyses on the whole net and portions of it are presented from which the problem of error propagation and the influence of the number of baselines can be studied. (Author)

8/6. GEOGRAPHY

AD-630 789 Fld. 8/6, 8/1
CFSTI Prices: HC $6.00 MF $1.25
NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL WASHINGTON D C PACIFIC SCIENCE BOARD
ATOLL RESEARCH BULLETIN. NO. 114. NORTHERN MARSHALL ISLANDS LAND BIOTA: BIRDS. NO. 115. MARINE BENTHIC ALGAE FROM THE LEEWARD HAWAIIAN GROUP. NO. 116. REEF STUDIES AT ADDU ATOLL, MALDIVE ISLANDS. NO. 117. ATOLL NEWS AND COMMENT,
by F. R. Fosberg, Roy T. Tsuda, and David R. Stoddart. 31 Mar 66, 207p. Contract Nonr-2300 (12)

Unclassified report

Descriptors: (*Marshall Islands, *Birds), (*Algae, Hawaii), (*Maldive Islands, Geography), (*Hawaii, Marine bioloby), Pacific Ocean, Coral reefs, Volcano Islands, Ecology

AD-630 983 Fld. 8/6, 8/7
CFSTI Prices: HC $3.00 MF $0.75
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
SELECTED ASPECTS OF GEOLOGY AND PHYSIOGRAPHY OF THE COLD REGIONS.
Cold Regions Science and Engineering Part 1: Environment; Section A: General,
by S. Russell Stearns. Jul 65, 52p. Rept. no. Science/Engineering-1-A1,
Proj. DA-1V025001A310,

Unclassified report

Descriptors: (*Geology, Polar regions), (*Geography, *Polar regions), Arctic regions, Antarctic regions, Maps

The purpose of this work is to provide those contemplating scientific or engineering activities in cold regions with a general picture of their geology and physiography. The cold regions are the Arctic, Alaska, Canadian Arctic and subarctic, Greenland, Iceland, Jan Mayen Svalbard, Scandinavia, U.S.S.R., and the Antarctica.

8/7. GEOLOGY AND MINERALOGY

AD-630 699 Fld. 8/7, 8/11
CFSTI Prices: HC $4.60 MF $0.50
TELEDYNE INDUSTRIES INC ALEXANDRIA VA EARTH SCIENCES DIV
PERTURBATION THEORY FOR THE INVERSION OF BODY WAVE TRAVEL-TIME DATA,
by Charles B. Archambeau, and Edward A. Flinn.
5 Apr 66, 41p. Rept. no. Seismic Data Lab-142,
Contract AF 33 (657)-15919,ARPA Order-624

Unclassified report

Descriptors: (*Perturbation theory, *Structural geology), Seismic waves, Propagation, Time, Curve fitting

Estimation of the internal elastic structure of the earth from body wave travel times ordinarily uses both arrival time data and the slope of a curve fitted to the observed travel times. There are well known difficulties in fitting such curves, particularly in cases where the observed travel times suggest a multivalued time function. A perturbation method is described in which an initial velocity distribution, which may be chosen to be in agreement with surface wave dispersion data over the region in question, is perturbed iteratively until the theoretical travel time function is in agreement, in the least-squares sense, with the observed data. The method does not require any estimate of the curve slope or multiplicity, nor does it require a particularly dense and complete data coverage over the entire distance range. Several phases can be used simultaneously. (Author)

AD-630 893 Fld. 8/7
CFSTI Prices: HC $5.60 MF $0.75
BOSTON COLL CHESTNUT HILL MASS
A CONTINENTAL-OCEANIC CRUSTAL BOUNDARY IN THE PACIFIC NORTHWEST.
Final rept., Apr-Oct 65 (Scientific),
by James W. Skehan. 20 Dec 65, 56p. Rept. no. Scientific-3,
Contract AF 19 (628)-1622, Proj. AF-4600, Task 460008,
AFCRL 65-904

Unclassified report

Descriptors: (*Geology, Oregon), Lithosphere, Resistance (Electrical), Structural geology, Geophysical prospecting, Washington (State), Marine geology, Theory

A compilation of geophysical and geological data shows a consistent relationship relative to the distribution of major tectonic units in the Pacific Northwest. The Olympic-Wallowa Lineament and the Blue Mountain Front seem to represent the surface expression of deep crustal boundaries between continental and oceanic crust at least during the early half of Cenozoic time. The continental block has high average deep crustal resistivity values; the oceanic, low average values. These deep crustal units are blanketed by a 10-15 km thick geophysical unit of 100-200 ohm-m resistivity. Speculations on the possiblity of continental-oceanic crustal boundaries and of fold mountains on other planets are presented. (Author)

AD-630 955 Fld. 8/7
WISCONSIN UNIV MADISON GEOPHYSICAL AND POLAR RESEARCH CENTER
THE GEOLOGY OF THE GENERAL BERNARDO O'HIGGINS AREA, NORTHWEST ANTARCTIC PENINSULA,
by Martin Halpern. 1965, 34p. Rept. no. Contribution-112,
Contract NSF-G24863,

Unclassified report

Availability: Published in Geology and Paleontology of the Antarctic, Antarctic Research Ser6 p177-209 1965. Copies to DDC users only.

Descriptors: (*Geology, *Antarctic regions), Stratigraphy, Petrology, Sedimentation, Paleontology, Geologic age determination

The O'Higgins area lies in a deformed orogenic or mobile belt. Detailed field mapping, petrographic examination of sedimentary and igneous rocks, potassium-argon dating of key rocks, and paleontologic evidence allows the name Legoupil Formation to be assigned to the part of the Cretaceous Period that dates from about 75 to 115 m.y. ago; they also provide details of stratigraphy and tectonic history of the O'Higgins area. This study exemplifies the usefulness of radiogenic dating for establishing age relationships of igneous rocks involved with unfossiliferous mobile belt deposits. The study also stresses the extreme variability of sediment types in mobile belts as the Legoupil Formation is characterized by an abundance of quartz-rich sands and a paucity of graded 'turbidites.'

AD-630 887 **See Fld. 12/1**

AD-630 967 **See Fld. 6/5**

AD-630 983 **See Fld. 8/6**

AD-631 028 **See Fld. 18/3**

AD-631 046 **See Fld. 20/14**

8/8. HYDROLOGY AND LIMNOLOGY

AD-630 838 Fld. 8/8
CFSTI Prices: HC $2.00 MF $0.50
UNITED STATES LAKE SURVEY DETROIT MICH
CURRENTS AT LITTLE LAKE HARBOR, LAKE SUPERIOR.
Research rept.,
by James H. Saylor. Jan 66, 35p. Rept. no. RR-1-1,

Unclassified report

Descriptors: (*Great Lakes, *Harbors), (*Hydrology, Great Lakes), Water waves, Tides, Graphics, Hydraulic models

Currents along the shore of Lake Superior in the vicinity of Little Lake Harbor, and currents in the dredged, breakwater-protected harbor entrance, were measured during the period from 1 to 17 September 1964 by Lagrangian and Eularian techniques. The current survey zone extended from about one kilometer east to about one kilometer west of the harbor. Measurements of currents were made during south-southeast (offshore), and west and northwest (prevailing onshore) winds. Significant wave heights varied from 0 to 2.0 meters.

AD-630 839 Fld. 8/8, 8/12, 17/7
CFSTI Prices: HC $3.00 MF $0.75
UNITED STATES LAKE SURVEY DETROIT MICH
GREAT LAKES ICE COVER, WINTER 1964-65.
Research rept.,
by R. E. Wilshaw, and D. R. Rondy. Dec 65, 83p. Rept. no. RR-5-1,

Unclassified report

Descriptors: (*Great Lakes, *Ice), Aerial photography, Airborne, Visual inspection, Ice islands, Navigation charts

This report describes the aerial ice reconnaissance program carried out by the U. S. Lake Survey during the winter of 1964-65, and presents 56 ice charts resulting from 27 one-day flights covering Lakes Superior, Michigan, Huron and Erie. Areas where photomapping of the ice cover was done by the U. S. Air Force are also indicated on a chart, and a photo mosaic of the northern end of Green Bay is included. (Author)

AD-631 057 **See Fld. 12/2**

8/10. PHYSICAL OCEANOGRAPHY

AD-630 937 Fld. 8/10, 18/8, 11/6
CFSTI Prices: HC $4.60 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
IRRADIATION EFFECTS ON REACTOR STRUCTURAL MATERIALS.
Quarterly progress rept. 1 Nov 65-31 Jan 66,
by L. E. Steele, J. R. Hawthorne, and C. Z. Serpan,Jr., 15 Feb 66, 43p. Rept. no. NRL-MR-1676,
Contract AT (49-5)-2110, Proj. RR007-01-46-5409 ,SF020-01-05-0858

Unclassified report

See also AD-626 466.

Descriptors: (*Reactor materials, Steel), (*Steel, Radiation damage), (*Radiation damage, Reactor materials), Brittleness, Annealing, Ductility, Notch sensitivity, Stainless steel, Neutron reactions, Organic moderated reactors, Nuclear power plants, Notch toughness, Rolling (Metallurgy), Microstructure

The report includes the following: (1) Comparative embrittlement of several commercial and experimental steels, (2) Directionality effects upon notch ductility of irradiated A212-B and A302-B steels, (3) Preliminary results on the influence of microstructure on radiation sensitivity, (4) Notch ductility of irradiated 304L and 347 stainless steels, (5) Properties of specimens from OMRE grid plate, (6) Results of first phase surveillance of Piqua Nuclear Power Facility. (Author)

AD-631 076 Fld. 8/10
CFSTI Prices: HC $1.10 MF $0.50
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
OCEANOGRAPHIC EXPEDITIONS OF THE U. S. NAVY HYDROGRAPHIC OFFICE IN THE ARCTIC IN 1961,
by O. V. Kolman. 1965, 2p. Rept. no. Trans-243,

Unclassified report

Okeanograficheskiye Ekspeditsii Gidrograficheskogo Upravleniya Vmf Ssha v Arktike v 1961 g. Trans. of Okeanologiya, Moscow v3 n3 p564-5 1963.

Descriptors: (*Oceanology, *Arctic regions), Hydrographic surveying, Oceanographic data

AD-631 086 Fld. 8/10
CFSTI Prices: HC $1.10 MF $0.50
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
A NEW OCEANOGRAPHIC INSTITUTE IN CANADA.
1965, 2p. Rept. no. Trans-244,

Unclassified report

Novyy Okeanograficheskii Institut V Kanada, trans. of Okeanografiya v3 p565 1963 (Moscow).

Descriptors: (*Oceanology, Canada), Universities, Education, Laboratories, Oceanographic equipment

The inauguration of the Canadian Oceanographic Institute took place on 25 October 1962 in Dartmouth. Officially named as the Bedford Institute of Oceanography the scientific center is located in a large building constructed for the purpose on

the ocean shore. The area designed for laboratories is about 2000 sq m. The laboratories are equipped with modern instruments. The administrative wing consists of 55 offices, auditoriums for conferences, library and cafeteria. The building was planned for a staff of 300 including the maintenance personnel. There is a special room for storing oceanographic equipment and instruments and a 150 - metre long pier for a large number of expeditionary vessels. The fleet will include the vessels of the east coast of the Canadian Hydrographic office, of the Atlantic Oceanographic group of the Center of Fishery vessels and four new ships, the largest of which will be the expeditionary vessel Hudson. A 200-meter long wharf adjoins the piers, which, together with the warehouse, form a vast port complex of the institute. The objectives of the institute are the study of the Atlantic Ocean, the subartic region and estuary areas. (Author)

AD-631 087 Fld. 8/10
CFSTI Prices: HC $1.10 MF $0.50
NAVAL OCEANOGRAPHIC OFFICE WASHINGTON D C
OCEANOGRAPHY IN JAPAN,
by O. V. Kol'man. 1965, 10p. Rept. no. Trans-242,
Unclassified report

Okeanografiia V Japonii, Trans. of Okeanologiia v3 n3 p559-64 Moscow 1963.

Descriptors: (*Oceanology, *Japan), Scientific organizations, Scientific personnel, Directories

A directory of the societies, associations, and committees that are responsible for oceanographic activities in Japan.

AD-631 146 Fld. 8/10, 17/1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
CHARACTERIZATION OF PARTICULATE MATTER IN THE OCEAN.
Final rept.,
by L. S. Birks, J. S. Grosso, R. J. Labrie, J. W. Sandelin, and D. J. Nagel. 18 Mar 66, 21p. Rept. no. NRL-6398,
Proj. RR-002-02-41-4951,
Unclassified report

Descriptors: (*Sonar signals, Reflection), (*Sea water, Particles), Electron microscopy, X-ray diffraction analysis, Electron beams, Fluorescence, Plankton, Plants (Botany), Organic materials, Iron

Electron micrographs of ocean filtrates collected near the surface at Key West, Block Island, and Chesapeake Bay show three common constituents: diatoms, plant fibers, and amorphous organic matter. In addition, material collected from layers giving strong sonar reflection at Key West and Block Island show numerous smaller iron-rich particles, probably a hydrated iron oxide, in the size range 0.01 to 0.1 micron. The iron particles are too small for x-ray diffraction but can be examined by x-ray fluorescence and electron probe analysis. In addition to iron, the particles show no other elements above atomic number 22, at least not above 1 percent composition. (Author)

AD-630 741 **See Fld. 8/3**

AD-631 080 **See Fld. 20/1**

8/11. SEISMOLOGY

AD-631 055 Fld. 8/11, 17/10
CFSTI Prices: HC $1.60 MF $0.50
MICHIGAN UNIV ANN ARBOR INST OF SCIENCE AND TECHNOLOGY
VESIAC MONTHLY BULLETIN OF VELA UNIFORM RESEARCH PUBLICATIONS.
15 Feb 66, 18p. Rept. no. VESIAC Bull-37,
Unclassified report

Descriptors: (*Seismology, Bibliographies), Underground explosions, Nuclear explosions, Earthquakes, Detection, Position finding, Seismic waves, Instrumentation, Identification systems

AD-631 134 Fld. 8/11
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
REFLECTION AND REFRACTION OF ELASTIC WAVES AT A CORRUGATED INTERFACE,
by Shuzo Asano. Feb 66, 23p. Contract AF-AFOSR-62-303,
Unclassified report

Availability: Published in Bull. of Seismological Soc. of America v56 n1 p201-21 Feb 1966. Copies to DDC users only.

Descriptors: (*Seismic waves, Propagation), (*Acoustics, Seismic waves), Mechanical waves, Reflection, Refraction, Structural geology, Surface properties, Boundary value problems

The effect of a corrugated interface on wave propagation is considered by using the method that was first applied to acoustical gratings by Rayleigh. By assuming both the amplitude and the slope at a corrugated interface to be small, quantities of the order of the square of corrugation amplitude are taken into account. Both normal and oblique incidence are considered. The effect of corrugation on reflection is larger than the effect on refraction; the amplitude of the regularly reflected waves decreases, and that of the regularly refracted waves and the scattered wave increases, as the corrugation amplitude becomes larger. (Author)

AD-630 559 **See Fld. 17/10**

AD-630 699 **See Fld. 8/7**

AD-631 043 **See Fld. 17/10**

AD-631 052 **See Fld. 17/10**

AD-631 105 **See Fld. 17/1**

8/12. SNOW, ICE, AND PERMAFROST

AD-630 648 Fld. 8/12
CFSTI Prices: HC $1.60 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
AN APPROACH TO THE CONSOLIDATION OF SNOW.
Research rept.,
by E. D. Feldt, and G. E. H. Ballard. Dec 65, 20p. Rept. no. RR-181,
Task 1V014501B52A02,
Unclassified report

Descriptors: (*Snow, Compacting), Porosity, Differential equations, Viscosity, Compression properties

A consolidation theory is developed for an age-hardened snow under uniaxial stress in the porosity range of 35 to 55% by considering one mechanism, viz., viscous flow of interparticle bonds. For a uniaxial stress sigma, the differential equation for porosity n in terms of time t is shown to be 1/(1-n) dn/dt = nu sigma n/eta (1-an) where a and nu are structural parameters and eta is the coefficient of viscosity of ice. Comparison of this equation and the integrated form with existing data predicts consistent and reasonable values for a. The predicted values of eta/nu range from 0.01 to 100 times the published values for eta, which may indicate that nu, and hence the consolidation rate, is greatly affected by the diagenetic history of the snow and the conditions of experimentation. (Author)

AD-630 804 Fld. 8/12, 13/6
CFSTI Prices:MF $0.50
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
EFFECTS OF AIR SURCHARGE ON THE BEARING CAPACITY OF SOFT COHESIVE SOILS.
Final rept.,
by Larry J. Lanz. Jan 66, 20p. Rept. no. Miscellaneous paper-4-767,
Unclassified report

Availability: Hard copy available from Waterways Experiment Station, Vicksburg, Miss., $0.50.

Descriptors: (*Soil mechanics, *Ground effect), (*Trafficability, Ground effect machines), Soils, Clay, Silt, Gas flow, Loading (Mechanics), Vehicles, Army equipment

A test program was conducted to determine the effects of air surcharge on the bearing capacity of soft, cohesive soils. The test soils were of two types, fat clay and silt. The penetration resistance of a 3-sq-in. circular plate was selected as the measure of bearing capacity to be used. Cone penetration tests were performed also for control purposes. The plate penetration tests were conducted using air-surcharge pressures of 0, 1, and 5 psi. Test results show that the bearing capacity of the highly saturated, cohesive soils used in this study was not altered in any significant way by the application of air-surcharge pressures as high as 5 psi. As a corollary, it was found that cone index was linearly related to plate bearing pressure in each soil type, regardless of the air surcharge applied. (Author)

AD-630 956 Fld. 8/12
WISCONSIN UNIV MADISON GEOPHYSICAL AND POLAR RESEARCH CENTER
DISTRIBUTION OF DIAGENETIC SNOW FACIES IN ANTARCTICA AND IN GREENLAND,
by Mario B. Giovinetto. 1964, 10p. Rept. no. Contribution-124,
Unclassified report

Availability: Published in Arctic v17 n1 p33-40 Mar 1964. Copies to DDC users only.

Descriptors: (*Snow, Polar regions), (*Antarctic regions, Snow), (*Greenland, Snow), Distribution, Climatology

AD-630 978 Fld. 8/12
CFSTI Prices: HC $1.00 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
MIGRATION OF LIQUID INCLUSIONS IN SINGLE ICE CRYSTALS.
Research rept.,
by P. Hoekstra, T. E. Osterkamp, and W. F. Weeks. Dec 65, 15p. Rept. no. CRREL-RR-183,
Task 1V014501B52A02,
Unclassified report

Descriptors: (*Ice, Transport properties), Sea water, Single crystals, Impurities, Salts, Diffusion, Zone melting

The migration of brine pockets of KCl and NaCl under the influence of a temperature gradient was investigated in single ice crystals. The observed migration velocities are compared with velocities calculated from a simple diffusion model using the data on electrolytic solutions available in the literature. Although the relative movements of KCl and NaCl pockets were consistent with the diffusion theory, the observed velocities were always less than the calculated. Neither the direction of the gravitational field nor the crystallographic orientation of the host crystal significantly influenced the rate of migration. It was also shown that the migration of solid KCl particles occurs at temperatures below the eutectic point. Two mechanisms are pro-

posed that would impede the mechanical differentiation of salts that crystallize at high temperatures relative to salts that remain in the brine of sea ice. These mechanisms explain recent field observations that the SO4/Cl ratio of sea ice does not increase with the age of the ice. (Author)

AD-630 982 Fld. 8/12, 20/13
CFSTI Prices: HC $2.00 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
PRELIMINARY CALCULATION OF THE ENERGY REQUIREMENT FOR PLACING AN INSTRUMENT PACKAGE UNDER ICE.
Research rept.,
by Chi Tien. Nov 65, 27p. Rept. no. RR-146,
Task DA-1V014501B52A02,
Unclassified report

Descriptors: (*Heat transfer, Ice), (*Ice, Melting), Instrumentation, Penetration, Mathematical analysis

The energy requirement for dispatching an instrument package through ice by thermal heating was estimated, and the feasibility of such an undertaking was determined. Heat fluxes were supplied through the bottom surface of the package as well as through the circumferential surfaces. The ice in contact with the package melts after sufficient heating, and as a consequence the package moves downward. With given assumptions, the energy requirement was estimated first by expressing the rate of melting (downward velocity of the package) in terms of the heat supplied through the bottom surface. With this information, the heat loss through the cylindrical surface was calculated. The sum of these two energy terms gives the total heat required. (Author)

AD-631 140 Fld. 8/12, 20/11
CFSTI Prices: HC $1.60 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
DIRECT SHEAR STUDY ON SNOW PROCEDURE AND DATA.
Special rept.,
by G. E. H. Ballard, E. D. Feldt, and S. R. Toth.
Dec 65, 16p. Rept. no. SR-92,
Proj. DA-1VO14501B52A02,
Unclassified report

Descriptors: (*Snow, Mechanical properties), Compressive properties, Test methods, Shear stresses

In order to gain a greater insight into the behavior of snow and to provide a body of data for the purpose of checking theoretical developments in snow mechanics, a direct shear experiment was performed on a standardized disaggregated snow, investigating the effect of porosity, age-hardening time, normal stress, and temperature on the shear strength. Incidental to the direct shear test, consolidation, frictional resistance, and strain data were recorded. This report describes the experimental procedure, and provides the data obtained from the experiment. (Author)

AD-630 603 See Fld. 20/6

AD-630 839 See Fld. 8/8

AD-630 902 See Fld. 14/2

AD-631 150 See Fld. 8/13

8/13. SOIL MECHANICS

AD-630 792 Fld. 8/13
CFSTI Prices: HC $6.00 MF $1.25
ERIC H WANG CIVIL ENGINEERING RESEARCH FACILITY UNIV OF NEW MEXICO ALBUQUERQUE
A STUDY OF THE PROPAGATION OF STRESS WAVES IN SAND.
Technical rept., Jan 64-May 65,
by Robert L. McNeill. Mar 66, 238p. Contract AF 29 (601)-6002, Proj. AF-5710,
AFWL TR-65-180
Unclassified report

Descriptors: (*Sand, *Shock waves), (*Soil mechanics, Shock waves), Shock tubes, Stresses, Mechanical waves, Propagation, Soils, Wave functions, Dynamics

The propagation of near-failure, soft-fronted stress waves in 5-foot-long, 1-inch-diameter, unconstrained rods of dry 20-30 Ottawa sand is studied. The input is created by a shock tube, modified to yield soft-fronted, long-duration, air-pressure loadings. Primary data are displacement-time histories from seven stations along the rod, read by light-sensing gages designed for negligible inertia and friction; secondary data are stress-time histories at the input and the rigidly held reaction ends. Static, dynamic, and additional static triaxial data are given. Variables are applied ambient stress and sand density. From findings that the material is strain-rate insensitive and follows Coulomb's failure law at subfailure stresses, the following observations of wave-propagation parameters for above-seismic stresses and a specific material condition have been made: (1) wave and particle velocities depend on the one-half power of ambient stress; (2) all energy densities depend on the first power of ambient stress; and (3) energy partitioning and reflection are independent of ambient stress. Effects of density on wave-propagation parameters for the sand and the variables studied are that (1) all increase with increasing density, (2) some are specifically linear on density, and all can be taken as such for engineering purposes, and (3) waveform parameters are much less sensitive to small errors in density than are static parameters. (Author)

AD-631 029 Fld. 8/13, 13/6
CFSTI Prices:MF $0.75
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
PERFORMANCE OF SOILS UNDER TIRE LOADS. REPORT 3. TESTS IN CLAY THROUGH NOVEMBER 1962.
Technical rept.,
by Robert D. Wismer. Feb 66, 79p. Rept. no. TR-3-666,
Proj. DA-1-V-0-21701-A-046, Task 03,
Unclassified report

Availability: U. S. Army Engineer Waterways Exp. Sta., Vicksburg, Miss. HC $0.75.

Descriptors: (*Soil mechanics, Clay), (*Clay, Trafficability), (*Tires, Mobility), Soils, Loading (Mechanics), Vehicles

This report analyzes the results of 184 multiple-pass tests with a single, smooth, pneumatic tire (9.00-14, 2-PR) in a fat clay at a high degree of saturation. These tests were performed using a wide range of tire loads, tire deflections, and soil strengths. Some of the tests were conducted to study the influence of speed on performance. Basic plots of the data (one dependent versus one independent variable with all other independent variables held constant) show the relative effect of each independent test variable on tire performance. Scatter of the pull and torque data points was found to be quite large for the early tests. An examination of the data showed that a difference in soil strength between the soil surface and the remainder of the soil mass was the probable cause of the scatter. Improvement in soil processing techniques subsequently produced more uniform soil conditions and virtually eliminated this scatter in the later tests. A simple static analysis was found adequate to represent the forces and moments on a towed or powered pneumatic tire operating at small sinkages in a soft clay. (Author)

AD-631 150 Fld. 8/13, 8/12
CFSTI Prices: HC $2.60 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
MIGRATION AND CRYSTALLIZATION OF INTERLAMELLAR WATER DURING FREEZING AND THAWING OF WYOMING BENTONITE.
Research rept.,
by Duwayne M. Anderson, and Pieter Hoekstra.
Dec 65, 24p. Rept. no. RR-192,
Task 1V014501B52A02,
Unclassified report

Descriptors: (*Clay. minerals, Freezing), (*Soil mechanics, Freezing), Water, Porous materials, Soils, Ice, Melting, Phase studies, X-ray diffraction analysis

Homo-ionic, clay-water pastes of Wyoming bentonite were studied at near freezing temperatures by X-ray diffraction. On freezing, the initial high d (001) spacings of the lithium- and sodium-bentonite pastes decreased, first to about 19A and, at about -10C, to 16A. When the temperature was raised the d (001) spacings of the frozen clays increased substantially; on melting, he d (001) spacings quickly expanded to their initial high values. The behavior of the hydrogen-aluminum-, potassium-, and calcium-bentonite was similar except that spacings greater than about 20A did not occur. Evidently, when bentonite-water pastes are frozen, all but two or three monomolecular layers of the interlamellar water migrate into the pore space to form ordinary ice. The remaining interlamellar water therefore must correspond to the 'unifrozen' water of previous investigations. Only the diffraction peaks corresponding to the normal hexagonal ice structure were detected. The relative intensities of the diffraction peaks revealed evidence of epitaxy in that the ice crystals appeared to be preferentially oreinted with their c-axes perpendicular to the c-axes of the clay crystals. (Author)

AD-630 561 See Fld. 1/5

8/14. TERRESTRIAL MAGNETISM

AD-630 783 Fld. 8/14, 9/2
CFSTI Prices: HC $3.00 MF $0.75
WISCONSIN UNIV MADISON GEOPHYSICAL AND POLAR RESEARCH CENTER
COMPUTER METHODS OF ANALYZING AEROMAGNETIC DATA.
Final research rept.,
by Richard J. Wold, and Thomas R. Wolfe. Jan 66, 88p. Rept. no. RR-66-1,
Contract Nonr-1202 (25), Proj. NR-307-293,
Unclassified report

Descriptors: (*Terrestrial magnetism, Programming (Computers)), (*Data processing systems, Geophysics), Airborne, Magnetometers, Digital recording systems, Data, Mapping, Digital computers

Digitally recorded aeromagnetic data can be read directly by a computer, the readings converted to values in gammas, any erroneous readings eliminated, and the regional field due to the dipole nature of the geomagnetic field removed. The data may then be profiled on any map projection and scale. Also surface fits of various degree polynomials can be made to the original data and contoured by an X-Y plotter. Finally differences between various fitted surfaces can be contoured. (Author)

AD-631 062 Fld. 8/14, 3/2, 4/1
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
INFLUENCE OF SOLAR ROTATION ON THE GEOMAGNETIC FIELD (I).
Research translation,
by Hu Yueh-jen. Sep 65, 11p. Rept. no. Emm-65-6,
Contract AF 19 (628)-5073,
TT 66-61011
Unclassified report

Trans. of Ti Ch'iu Wu Li Hsueh Pao (Chinese People's Republic) v7 n2 p103-7 1958.

Descriptors: (*Solar disturbances, *Magnetic storms), (*Terrestrial magnetism, Celestial mechanics), Sun, Rotation, Geophysics, China

AD-631 120 Fld. 8/14, 3/3
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
INFLUENCE OF SOLAR ROTATION ON THE GEOMAGNETIC FIELD (II).
Research translation,
by Hu Yueh-jen. Sep 65, 17p. Rept. no. Emm-65-7,
Contract AF 19 (628)-5073,
TT 66-61024

Unclassified report

Trans. of Ti Chiu Wu-Li Hsueh-Pao (Chinese People's Republic) v8 n2 p123-31 1959.

Descriptors: (*Magnetic storms, *Solar disturbances), Sun, Celestial mechanics, Terrestrial magnetism, Geophysics, China

The following problems are studied: (1) The frequency distribution of magnetic storms: large as well as moderate magnetic storms occur more frequently on some days during the period of solar rotation than others. (2) The periodic variation of the daily K index total during the period of solar rotation: the K index is a comparatively more objective standard for indicating geomagnetic activity. Curves showing its variation are primarily consistent with the frequency distribution curves of international magnetically disturbed days. (3) The periodic variation of the daily average of the geomagnetic field's horizontal intensity during the period of solar rotation: similar to the case of the K index, the effect of solar rotation on the horizontal intensity is also very pronounced. The crest occurs within the period of solar rotation when there are fewer disturbed days and the trough occurs when there are more disturbed days. The time lag is approximately one day in both cases. (Author)

AD-630 928 **See Fld. 4/1**

Field 9-ELECTRONICS AND ELECTRICAL ENGINEERING

9/1. COMPONENTS

AD-630 565 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
NATIONAL CO INC MELROSE MASS
PRODUCTION ENGINEERING MEASURE FOR CESIUM BEAM TUBES.
Quarterly progress rept. no. 9, 23 May-23 Aug 65,
by James George. 23 Aug 65, 21p. Contract DA-36-039-AMC-01457,

Unclassified report

See also AD-622 437.

Descriptors: (*Cesium electron tubes, Manufacturing methods), Life expectancy, Electron tube heaters, Demodulators, Quality control, Signal-to-noise ratio, Performance (Engineering)

Life testing to date of the retrofitted PEM-E3 cesium beam tube has yielded satisfactory results. Results of the evaluation of the retrofitted PEM-E5 and PEM-E6 cesium beam tubes indicate that the redesigned cesium oven corrects the beam-regulation and oven-input-powerrequirement problems and that the redesigned cesium detector corrects the signal-to-noise ratio problem. (Author)

AD-630 587 Fld. 9/1, 20/12
CFSTI Prices: HC $2.00 MF $0.50
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
CURRENT-VOLTAGE CHARACTERISTICS OF THIN -FILM DIODES.
Technical rept., Mar-Jun 65,
by R. D. Hitchcock. Mar 66, 40p. Rept. no. TR-R-435,
Proj. Y-R011-01-01-049,

Unclassified report

Descriptors: (*Diodes (Semiconductor), Semiconducting films), (*Electrical properties, Diodes (Semiconductor)), Aluminum, Aluminum compounds, Oxides, Lead, Films, Superconductivity, Tunneling (Electronics), Cryostats, Deposition, Voltage, Electric currents, Cryogenics

The current-voltage (I-V) characteristics of thin-film diodes were measured at 4.2K, 77K, and room temperature. Superconductive tunneling was achieved with a diode consisting of aluminum, aluminum oxide, and lead (Al/Al2O3/Pb). In the nonsuperconducting state the Al/Al2O3/Pb type of thin-film diode exhibited Zener breakdown between 1.5 and 3.5 volts. However, the Al/Al2O3/Pb diodes did not have reproducible I-V characteristics, and the nonsuperconducting Al/Al2O3/Pb diode could not be operated with AC voltage long enough to serve as a practical electronic device. A thin-film diode consisting of aluminum, aluminum oxide, manganese, and lead exhibited power -law I-V characteristics at ambient temperatures, under 60-cycle excitation, and could be operated with a reproducible I-V characteristic for several hours. Bistable switching was achieved with a thin-film diode consisting of aluminum, aluminum oxide, lead, and aluminum; in this diode the short-circuit state was produced by a high-voltage pulse and the open-circuit state by a low-voltage pulse. A theoretical analysis of the observed I-V characteristic is presented. (Author)

AD-630 598 Fld. 9/1
CFSTI Prices: HC $1.60 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH NJ
EFFECTS OF FINITE BEAM SIZE ON THE NOISE FIGURE OF TRAVELING-WAVE TUBES IN HIGH MAGNETIC FIELDS.
Technical rept.,
by Bruno Zotter. Feb 66, 20p. Rept. no. ECOM-2669,
Proj. DA-1L0-13001A-91A, Task 1L0-13001A-91A-23-00,

Unclassified report

Descriptors: (*Traveling-wave tubes, Noise (Radio)), Magnetic properties, Magnetic fields, Electron beams, Space charges, Voltage, Partial differential equations

The dependence of noise figure of traveling-wave tubes on magnetic fields is calculated in terms of a recently published method. This method shows that the relevant terms cancel out and that there is no first-order dependence. The negative result is explained as an inherent failure of this approach, which does not take into account two noncoherent noise sources. An alternate approach is suggested, using transformation properties of the electron beam capable of carrying four axially -symmetric waves. It is deduced that the transverse modes are cooled by high magnetic fields and that energy interchange between the purely longitudinal space-charge modes and the two purely transverse modes can occur. The detailed calculation of the energy interchange will be published in a forthcoming report. (Author)

AD-630 680 Fld. 9/1, 20/12
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
INSULATED-GATE FIELD-EFFECT TRANSISTOR USING SINGLE CRYSTAL CADMIUM SULFIDE.
Revised ed.,
by J. Conragan, and R. S. Muller. 15 Sep 65, 3p.
Contract DA-31-124-ARO (D)-385,
AROD 5537:1

Unclassified report

Revision of manuscript submitted 27 Jul 65.

Availablility: Published in Solid State Electronics v9 p182 1966. Copies to DDC users only.

Descriptors: (*Transistors, *Semiconductors), Inorganic compounds, Oxides, Cadmium compounds, Sulfides, Films, Single crystals, Electric currents, Voltage, Field theory, Gates (Circuits), Vapor plating, Vacuum apparatus

Metal-oxide-semiconductor (MOS) transistors were constructed on prepared substrates of high resistivity, single-crystal cadmium sulfide. The transconductance, output conductance, gate-source and gate-drain capacitances for these devices were of the same general magnitudes as were obtained on deposited polycrystalline CdS thin-film transistors (TFT's) of similar dimensions. Initial tests indicate that the drain current-drain voltage characteristics of the single-crystal CdS MOS transistor are less temperature sensitive than are the characteristics of deposited, polycrystalline, thin-film, CdS devices (TFT's). In both single crystal and thin-film transistors, the oxide layer and electrodes are vacuum deposited using similar procedures. The large difference in the temperature stabilities of the two types of devices indicates that the source of the temperature dependence lies in the deposited, thin-film nature of the semiconductor layer.

AD-630 690 Fld. 9/1, 17/2
CFSTI Prices: HC $3.00 MF $0.75
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
SMALL SIGNAL FUNCTIONAL CIRCUITS.
Final technical rept. no. 4, 1 Jul 64-30 Jun 65,
by James Feit, and Robert McGinnis. Mar 66, 95p. Contract DA-28-043-AMC-00150 (E),
Proj. DA-1P6-22001-A-056-02,
ECOM 00150-F

Unclassified report

See also AD-615 125, AD-620 800, AD-608 422.

Descriptors: (*Integrated circuits, *Radio receivers), Portable, Silicon, Radiofrequency amplifiers, Mixers (Electronic), Oscillators, Frequency modulation, Circuits, Microminiaturization (Electronics), Intermediate frequency amplifiers

A description is given of the design of silicon linear integrated circuits and of a 51-mc FM manpack communications receiver utilizing these circuits. The following items were developed: (1) RF amplifier - A low power drain integrated circuit capable of 15-18 db power gain at 51 mc. (2) mixer - a low power drain integrated circuit capable of 20 db conversion gain as a first mixer and 28 db conversion gain as a second mixer. (3) first oscillator - a low power drain crystal-controlled integrated-circuit oscillator capable of providing sufficient oscillator injection at frequencies ranging from 36.3 mc to 46.3 mc. (4) second oscillator - a low power drain crystal-controlled integrated-circuit oscillator capable of providing oscillator injection at 10.245 mc to the second mixer. (5) integrated-circuit demonstration receiver - an FM receiver incorporating the above listed integrated circuits and other integrated circuits (AD-614 090). The demonstration receiver meets the AN/PRR-9 Manpack receiver electrical performance specifications with a significant reduction in receiver power drain. (Author)

AD-630 694 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
MALLORY (P R) AND CO INC INDIANAPOLIS IND

PRODUCTION ENGINEERING MEASURE FOR IMPROVED RELIABILITY OF SOLID ELECTROLYTE TANTALUM CAPACITORS.
Quarterly rept. no. 10, 30 Sep-29 Dec 65,
by A. W. H. Smith. 29 Dec 65, 12p. Contract DA-36-039-AMC-03623 (E)

Unclassified report

See also AD-625 584.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Electrolyte capacitors, Reliability (Electronics), Performance (Engineering), Production, Life expectancy, Electrical properties

5,249 capacitors are now on 85C Life Test. All the Group B and D tests are in progress. With only one failure recorded, a total of 8.8 x 10 to the 6th power unit hours of 85C life test was accumulated. At 60% confidence, this represents a 0.025% per 1000 hours failure rate.

AD-630 710 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
MIDLAND-WRIGHT KANSAS CITY KANS
PRODUCTION ENGINEERING MEASURE: RELIABLE QUARTZ CRYSTAL MICROELEMENTS, TYPES EL-MCRO1 (X-1) AND EL-MCRO2 (X-1).
Quarterly progress repts. nos. 1-3, 13 Jan-29 Sep 65,
by Stuart Radetsky. 29 Sep 65, 26p. Contract DA-36-039-AMC-03639 (E)

Unclassified report

Descriptors: (*Microminiaturization (Electronics), *Quartz), Resistance (Electrical), Reliability (Electronics), Manufacturing methods, Performance (Engineering)

A combination plater--sealer unit with two evacuation chambers has been built. Vacuums less than 1-micron in the plater chamber and 10-microns in the sealer chamber have been obtained. Successful resonator plate designs have been developed in three of the six frequencies required.

AD-630 784 Fld. 9/1, 13/8, 14/4
CFSTI Prices: HC $3.00 MF $0.75
TRW SEMICONDUCTORS INC LAWNDALE CALIF
PRODUCTION ENGINEERING MEASURE: RELIABILITY THROUGH PROCESS IMPROVEMENT (EXTENSION TO 2N2525 TRANSISTOR FAMILY).
Final rept., 1 Mar-31 Oct 65,
by A. Brand, and B. Wiley. 31 Oct 65, 82p. Contract DA-36-039-sc-86742 (E),

Unclassified report

See also AD-608 725, -613 687, -619 375.

Descriptors: (*Transistors, Manufacturing methods), Reliability (Electronics), Packaging, Ceramic materials, Dies, Silicon, Hermetic seals, Beryllium compounds, Oxides, Welding

Process improvement work was conducted to obtain a silicon triple diffused transistor based on type 2N2525 with a maximum operating failure rate of 0.01% per one thousand hours at a 90% confidence level at 25C. Successful improvements were made in the flange-to-ceramic bonding, metallizing, feed-through pin seal, die attachment, and final closure. A thorough understanding of metal to ceramic interfaces was gained. The performance of the package summarized as follows: (1) Hermeticity is very good and unaffected by high temperatures and environmental testing. (2) The overall mechanical strength of the package is very good in every respect, with the possible exception of the ultimate strength of the BeO ceramic. At present work is in progress to increase its strength to equal that of aluminum oxide ceramics. (3) Cold weld capping yields exceed 95%, thus having great promise for future production. (4) Heat dissipation is extremely good.

AD-630 800 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
MCCOY ELECTRONICS CO MOUNT HOLLY SPRINGS PA
PRODUCTION ENGINEERING MEASURE: MANUFACTURE OF GLASS HOLDER CRYSTAL UNITS TYPE CR (XM-66).
Quarterly progress rept. no. 2, 25 Sep-25 Dec 65. 25 Dec 65, 33p. Contract DA-36-039-AMC-06167 (E)

Unclassified report

See also AD-626 859.

Descriptors: (*Crystal holders, Manufacturing methods), (*Quartz resonators, Manufacturing methods), (*Glass, Crystal holders), Oscillators, Vibrators (Electrical)

AD-630 835 Fld. 9/1, 18/8
CFSTI Prices: HC $2.60 MF $0.50
HUGHES AIRCRAFT CO FULLERTON CALIF
EFFECT OF TRANSISTOR DESIGN PARAMETERS ON RADIATION RESPONSE (POWER TRANSISTORS).
Quarterly rept. no. 1, 1 Jul-30 Sep 65,
by V. R. Honnold, G. D. Thomas, and J. J. Mazenko. Mar 66, 23p. Rept. no. FR-66-17-105,
Contract DA-28-043-AMC-01541 (E) Task NWER 16.0091,
ECOM TR-01541-1

Unclassified report

See also AD-425 369, AD-630 836.

Descriptors: (*Transistors, Radiation damage), Design, Silicon, Transients, Theory, Analysis of variance, Manufacturing methods, Ionization, Electric currents

The object is to determine design characteristics and fabrication techniques for a silicon planar power transistor that will minimize the effects of ionization and lattice displacement caused by high energy radiation. The experimental phase uses specially designed transistors in which various design variations have been included. Radiation testing of these transistors is in accordance with factorial design principles. The data are analyzed using the techniques of the analysis of variance. The theoretical effort is based on transistor physical design theory and is used to correlate and verify the results of experiment. Work during the first quarter consisted of the formulation of physical design theory including the effects of injection level. In addition, the sequencing of the fabrication steps for the 2N2369 was laid out in accordance with statistical design principles and transistor fabrication was initiated. Instrumentation design was completed and construction started on the circuits. (Author)

AD-630 836 Fld. 9/1, 18/8
CFSTI Prices: HC $3.60 MF $0.50
HUGHES AIRCRAFT CO FULLERTON CALIF
EFFECT OF TRANSISTOR DESIGN PARAMETERS ON RADIATION RESPONSE (POWER TRANSISTORS).
Quarterly rept. no. 2, 1 Oct-31 Dec 65,
by V. R. Honnold, G. D. Thomas, and J. J. Mazenko. Apr 66, 32p. Rept. no. FR-66-17-106,
Contract DA-28-043-AMC-01541 (E) Task NWER 16.0091,
ECOM TR-01541-2

Unclassified report

See also AD-630 835.

Descriptors: (*Transistors, Radiation damage), Design, Silicon, Transients, Theory, Analysis of variance, Manufacturing methods, Ionization, Electric currents, Gain, Combinatorial analysis

The theory of irradiation data analysis is worked out in accordance with the techniques of the analysis of variance. The basic irradiation data consists of two sets of numbers associated with each design variation (treatment). The first set is the slope of the common base current gain as a function of fluence for a particular emitter current. The second set, which characterizes the response of a device to a pulse of ionizing radiation, is the maximum amplitude of the transient collector base leakage current produced by the pulse. In preparation for data analysis by digital computer, a double subscript notation is worked out, representing a particular design factor and a treatment number respectively, and is applied in the development of various sum-of-square expressions required for the analysis of variance. (Author)

AD-630 935 Fld. 9/1, 13/8
CFSTI Prices: HC $7.00 MF $1.50
INTERNATIONAL RESISTANCE CO PHILADELPHIA PA DOCUMENTED RELIABILITY DIV
PRODUCTION ENGINEERING MEASURES FOR HIGH RELIABILITY, FIXED, FILM, PRECISION RESISTORS. QUALITY CONTROL MANUAL.
Final engineering rept., sect 2.
30 Nov 65, 328p. Contract DA-36-039-AMC-01461 (E)

Unclassified report

See also AD-624 436.

Descriptors: (*Fixed resistors, Manufacturing methods), Reliability (Electronics), Quality control, Films, Production

CONTENTS: Policy and objectives; employment and training administrative organizations; documentation; calibration control system; incoming inspection; in-process control; special processes; final quality control acceptance; stamp control; non-conforming material; customer returned material; exhibits.

AD-630 948 Fld. 9/1, 13/8
CFSTI Prices: HC $6.00 MF $1.25
HAMILTON STANDARD DIV UNITED AIRCRAFT CORP BROAD BROOK CONN
MICROBONDS FOR HYBRID MICROCIRCUITS.
Quarterly rept. no. 5, 1 Feb-30 Apr 65,
by P. R. Amlinger, and S. Rogers. Feb 66, 255p. Rept. no. HSER-3117,
Contract DA-36-039-AMC-03742 (E), Proj. DA-1P6-22001-A-057,

Unclassified report

See also AD-623 284.

Descriptors: (*Bonding, Microminiaturization (Electronics)), (*Electric connectors, Bonding), (*Microminiaturization (Electronics), Circuits), Circuit interconnections, Gold, Aluminum, Electric wire, Welding, Metal films, Aging (Materials), Chromium, Nickel, Glass, Silicon, Molybdenum, Manganese, Films, Mechanical properties, Statistical analysis, Intermetallic compounds, Aluminum compounds, Oxides

Test results, statistical analysis, and failure modes of over ten types of split-tip welded microbonds between fine gold and aluminum wires (.0007, .002 and .005-in. dia.) to gold and aluminum films are discussed as well as bonding techniques for the newly emerging flip-chip devices. Reliable split-tip welded microbonds can be made between gold wires and films of gold/chromium or gold/nickel/molybdenum manganese on 'as-fired' alumina. The quantity of gold system microbonds on glass, glazed alumina, and oxidized silicon were statistically analyzed. A minimum of 15,000 A of gold are required to obtain optimum microbonds. The optimum thickness of the fired -on Au-Ni-MoMn system was 0.001 inch. The sensitivity of glass and glazed alumina substrates to thermal shock adversely affected bond strength reliability. Gold system microbonds on oxidized silicon substrates could not be made meeting the full reliability requirements of the contract although a fair degree

of reproducibility was demonstrated. Marginal or unsatisfactory microbonds were found between aluminum wire and Au/Cr or aluminum films regardless of substrate material. (Author)

AD-630 950 Fld. 9/1
CFSTI Prices: HC $1.60 MF $0.50
MICTRON INC ALBANY N Y
C. W. X-BAND VOLTAGE TUNABLE OSCILLATOR.
Rept. no. 9, 1 Jul 63-31 Oct 65 (Add. to Final), by M. R. Boyd. 31 Oct 65, 18p. Contract DA-36-039-AMC-03270 (E) Proj. DA-1P6-22001-A-055-04,
Unclassified report

See also AD-628 093.

Descriptors: (*Microwave oscillators, X band), (*Magnetrons, X band), Electron tubes, Performance (Engineering), Tuning circuits, Voltage, Theory, Design, Cavity resonators, Electron tube parts

CONTENTS: Appendix V: Mode distribution in magnetron structure. Appendix VI: Packaging technology. Appendix VII: Operation in theta modes.

AD-631 021 Fld. 9/1, 13/8
CFSTI Prices: HC $1.00 MF $0.50
LEWIS (E B) CO INC EAST HARTFORD CONN
PRODUCTION ENGINEERING MEASURE: CRYSTAL UNIT CR- (XM-46A).
Quarterly rept. no. 11, 1 Aug-1 Nov 65, by Robert P. McComb. 1 Nov 65, 24p. Contract DA-36-039-sc-86737,
Unclassified report

See also AD-629 178.

Descriptors: (*Crystal filters, Manufacturing methods), Very high frequency, Resistance (Electrical), Performance (Engineering), Quartz, Wiring diagrams

Conclusions: The measurements of parameters at 70 MC/s according to SCS-135A and Modification No. 7 can be accomplished. The systematic error involved in measurement results was clarified and a correlation established. The fabrication of the 70 MC/s units is critical as to the technique required to 'finish' the crystal units to frequency. The measurement of frequency and resistance deviation over the operating temperature range -55 to +90C can be adequately and economically done if a coil is used in series with the crystal unit. (Author)

AD-631 027 Fld. 9/1, 9/2
CFSTI Prices: HC $2.00 MF $0.50
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
INTEGRATED CIRCUITS FOR FIELDATA COMPUTERS.
Quarterly technical rept. no. 1, 1 Jul-30 Oct 65, by Ury Davidsohn, and James Solomon. Mar 66, 40p. Rept. no. T-16,
Contract DA 28-043-AMC-01630 (E), Proj. DA-1P622001A056, Task 02,
ECOM 01630-1
Unclassified report

Descriptors: (*Semiconductor devices, *Computer logic), Circuits, Dielectrics, Single crystals, Gates (Circuits), Glass, Silicon, Silicon compounds, Dioxides, Etching, Amplifiers, Digital systems, Linear systems

MATERIALS AND PROCESSES: Two dielectric isolation methods were explored for implementation of circuits. These are: (1) thermally grown silicon dioxide with a polycrystalline silicon matrix, and (2) glass isolation with a dummy silicon support slice. The latter technique appears most applicable because of still lower capacitances to the substrate. The glass isolation lends itself to the simpler implementation of beam-lead technology if desired. CIRCUITS: Emitter current-steered (ECL) and saturating high speed (TTL) circuit configurations were explored, both with the view toward obtaining the required speed/power product. The circuits were also considered from the point of view of radiation hardening possibilities. The present activities are directed toward the use of the TTL logic function. Linear high frequency amplifier studies were performed and evaluations made as to implementation utilizing dielectric isolation techniques. (Author)

AD-631 034 Fld. 9/1, 9/5, 13/8
CFSTI Prices: HC $2.00 MF $0.50
TEXAS INSTRUMENTS INC DALLAS SEMICONDUCTOR-COMPONENTS DIV
THIN FILMS FORMED BY ELECTROCHEMICAL REACTIONS.
Quarterly technical rept. no. 8, 1 Sep-30 Nov 65, by Michael J. F. Gaze, and Joe P. Keene. Feb 66, 38p. Rept. no. 03-66-10,
Contract DA-36-039-AMC-02324 (E), Proj. 1CO-24401-A112-04,
ECOM 02324-8
Unclassified report

See also AD-627 849.

Descriptors: (*Integrated circuits, Preparation), (*Resistors, Films), (*Dielectric films, Preparation), (*Amplifiers, Integrated circuits), (*Sputtering, Tantalum), Deposition, Aging (Materials), Tantalum compounds, Manganese compounds, Oxides, Impurities, Gold, Thermal properties

The report summarizes work done on techniques for fabricating thin conductive, resistive and dielectric films by complete or partial oxidation of a suitable metallic film deposited in predetermined patterns and sequences. Investigation of the mechanism of the deposition process continued. A general law for the relationship between resistivity and time is expressed in logarithmic form. A study was made of the aging characteristics of deposited films. A large series of tests has begun in order to obtain information on the reactive-sputtered Ta2O5 dielectric. The 455 kHz amplifier test vehicle did not notch at the nominal frequency but rather at 1.5 MHz. Attempts were made to selectively etch reactively sputtered tantalum by back sputtering. The conclusions on work results are: (1) For a practical production process, a limit of about 500 ohms/square for sheet resistivity must be set; (2) Better control of the sputtering ambient gas is necessary; (3) Work on the 455 kHz amplifier has stopped pending further work on the MnO2 layer to reduce capacitor losses at high frequency; (4) Gold-doped resistors require further analysis to establish temperature coefficient of resistivity values and the maximum sheet resistance obtainable; and (5) Sputter etching is not applicable to the removal of heavily oxidized tantalum films from silicon oxide substrates. (Author)

AD-631 053 Fld. 9/1
CFSTI Prices: HC $2.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J INST FOR EXPLORATORY RESEARCH
FERRITE CABLE CHOKES.
Technical rept.,
by Ernest T. Harper. Mar 66, 47p. Proj. 1P0-14501-B31A, Task 1P0-14501-B31A-01,
ECOM 2675
Unclassified report

Descriptors: (*Coaxial cables, *Ferrites), Miniature electronic equipment, Inductance, Theory, Radiofrequency, Capacitance, Broadband

A theoretical and experimental investigation was made of the factors affecting the performance of toroidal inductors with ferrite cores and windings of coaxial cable. Design procedures are developed and described for toroidal cable chokes which provide a specified minimum amount of rf isolation over a band of frequencies. It is shown how one may maximize the width of the frequency band for a given rf isolation impedance. The entire band, from 2 to 30 Mc, may be covered by a set of only three individual cable chokes, providing an rf isolation of better than 5,000 ohms. (Author)

AD-631 054 Fld. 9/1, 9/5
CFSTI Prices: HC $1.00 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
A COAXIAL CAVITY POWER AMPLIFIER (1300 TO 2400 MEGAHERTZ).
Technical rept.,
by George C. Fincke Jr.. Mar 66, 17p. Proj. 1P6-22001-A-055, Task 1P6-22001-A-055-02, ECOM 2679
Unclassified report

See also AD-248 956.

Descriptors: (*Power amplifiers, Coaxial cables), Tetrodes, Ultrahigh frequency, Microwave amplifiers, Radiofrequency

A power amplifier of 50 watts power output, tunable from 1300 to 2400 megahertz, was designed and constructed for use with the power tetrode, type Z-5267. The single-ended coaxial amplifier has a power gain of 10 decibels plus or minus 1/2 decibel across the band at an instantaneous bandwidth of one per cent and a plate efficiency of 25 per cent. Double, noncontacting, one-quarter wavelength, 'bucket'-type choke, tuning plungers are used in both the input and output coaxial cavities. The overall size of the amplifier, including the tuning mechanisms, is 6.75 inches wide by 21.75 inches long. Design considerations and operating conditions are discussed. The Appendix contains lists of materials used and the numbers for the individual parts drawings. (Author)

AD-631 064 Fld. 9/1, 13/8
CFSTI Prices: HC $2.00 MF $0.50
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
HIGH SPEED SEMICONDUCTOR SWITCH (TWO TERMINAL) AND HIGH SPEED SEMICONDUCTOR SWITCH (GATE).
Quarterly rept. no. 10, 29 Aug-28 Nov 65, by B. G. Burlingame. 28 Nov 65, 46p. Contract DA-36-039-AMC-01475 (E)
Unclassified report

See also AD-619 770.

Descriptors: (*Semiconductor devices, Manufacturing methods), (*Electronic switches, Semiconductor devices), Gates (Circuits), Switching circuits, Gold, Diffusion, Phosphorus, Oxides, Voltage, Specifications

Activities included the evaluation of a process change designed to increase dv/dt capabilities, evaluation of turn-on time methods and characteristics of the two-terminal device, preparation of revised specifications for both two- and three-terminal device types, and the preparation of test procedures. Test facilities for preproduction lots were completed, and work was started on production life test equipment for the two- and three-terminal device types as well as the type 2N1765 which is being produced by Motorola as a consideration for specification and schedule revisions. (Author)

AD-631 122 Fld. 9/1, 13/8
CFSTI Prices: HC $3.60 MF $0.50
BOMAC DIV VARIAN ASSOCIATES BEVERLY MASS
PRODUCTION ENGINEERING MEASURE FOR LOW FIELD MAGNETRON BL-234C.
Quarterly progress rept. no. 3, 28 Oct 65-28 Jan 66,
by Arnold M. Eklund. 28 Jan 66, 39p. Contract DA-36-039-AMC-06162 (E)
Unclassified report

See also AD-627 534.

Descriptors: (*Magnetrons, Manufacturing methods), Cathodes (Electron tubes), Performance (Engineering), Machining, Anodes (Electron tubes), Radiofrequency power, Nickel, Tungsten

The second group of engineering tubes, Tube Nos. 6 S through 10S, have shown significant improvement in performance over the first group of tubes. In general, 400 watts peak output power was exceeded in all tubes with considerably broader operating voltage mode widths. Operating life improved by a factor of more than 2 to 1 with tube 6S reaching 74 hours before pulse instabilities exceeded specified limits. An extended vacuum, bakeout, and activation procedure has been initiated during this period that will make, in all probability, 100 hours operating life readily achievable. Two cathode types have been processed in tubes using this procedure, the Bomac nickel matrix and the Spectra-mat directly heated tungsten dispenser, and initial life test results show promise. Receipt of the tungsten carbide modified broaches has been realized, and completion of the evaluation of conventionally machined modes is now expected near the beginning of the next quarter. Some difficulties have been encountered in obtaining pi mode resonance within the specified frequency range from anodes obtained from the next hob. The previous hob, from which four of the five tubes of the second group of engineering tubes were obtained, failed after a total of 68 pushes. Completion of rework of the Government furnished vacuum system has been delayed due to problems associated with flange and valve leaks in the ultra high vacuum portion of the system. Bell jar vacuum has exceeded 4 x 10 to the minus 6 mm Hg, which is more than adequate for tube envelope vacuum during extended temperature bakeout. (Author)

AD-631 188 Fld. 9/1, 17/8, 20/6
CFSTI Prices: HC $5.60 MF $0.50
RCA LABS PRINCETON N J
BRIGHTNESS INTENSIFIER STUDY.
Technical rept. for 15 Sep 54-30 Nov 56,
by G. A. Morton, J. E. Ruedy, A. J. Kelley, and S. A. Ward. May 60, 56p. Contract AF 33 (616)-2631, Proj. AF-7072, Task 70827, ARL TR-60-284

Unclassified report

Descriptors: (*Image intensifiers (Electronics), *Brightness), (*Vision, Thresholds (Physiology)), (*Iconoscopes, Sensitivity), Light, Amplifiers, Image orthicons, Optics, Feasibility studies

The basic limits of vision and image detection are discussed. Experimental results with the direct view intensifier are reported. A general discussion of pickup tube limitations concludes that the image intensifier orthicon is a very suitable pickup tube for a brightness intensifier amplifying a low light scene. Other intensifications methods and storage operation of intensifier orthicons are also investigated and discussed. The use of the image intensifier orthicon for optical pulse ranging is suggested. (Author)

AD-630 567 See Fld. 17/2

AD-630 711 See Fld. 17/2

AD-630 719 See Fld. 20/12

AD-630 770 See Fld. 17/1

AD-630 894 See Fld. 9/5

AD-630 905 See Fld. 17/2

AD-631 035 See Fld. 9/5

AD-631 038 See Fld. 10/1

AD-631 115 See Fld. 9/5

AD-631 123 See Fld. 9/5

AD-631 163 See Fld. 9/3

9/2. COMPUTERS

AD-630 610 Fld. 9/2
CFSTI Prices: HC $2.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
M-460 PROGRAM NOTES: SOME LISP ROUTINES FOR MANIPULATING AUTOMATA.
Physical and Mathematical sciences research papers,
by Thomas V. Griffiths. Feb 66, 38p. Rept. no. AFCRL-PMSRP-192,AFCRL-66-84
Proj. AF-4641, Task 464101,

Unclassified report

Descriptors: (*Programming (Computers), Computer logic), Automata

The report documents a set of LISP routines for manipulating finite-state machines. Though most of the LISP routines defined perform classical automata constructions, there are some routines operating on a non-deterministic version of a machine similar to the generalized sequential machine. A users' manual is included for the routines. (Author)

AD-630 625 Fld. 9/2, 9/4
CFSTI Prices: HC $2.00 MF $0.50
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
CONVOLUTIONAL TRANSFORMATIONS OF BINARY SEQUENCES: BOOLEAN FUNCTIONS AND THEIR RESYNCHRONIZING PROPERTIES,
by Franco P. Preparata. Mar 66, 41p. Rept. no. R-283,
Contract DA-28-043-AMC-00073 (E), Proj. DA-20014501B31F

Unclassified report

Descriptors: (*Computer logic, *Sequences), (*Transformations (Mathematics), Sequences), Special functions (Mathematical), Information theory, Coding, Feedback

Non-feedback shift registers (finite-memory encoders) can be profitably adopted to perform transformations of binary sequences. The output sequence is convolutionally obtained by 'sliding' the encoding device along the input sequence and producing a symbol at each shift. Invertible transformations are characterized and decoding schemes are analyzed. The crucial point in the decoding problem is that the simply finite-memory feedback decoder presents the undesirable well-known error propagation effect, while the non-feedback decoder contains, in general, an indefinite number of stages. Finite-memory non-feedback decoding is feasible, however, if some constraint is imposed on the input sequences, or, equivalently, if some decoding error is tolerated. The analysis is conducted through the concepts of resynchronizing states of Boolean functions. The algebraic properties of resynchronizing states are carefully analyzed; it is shown that they can be assigned only in special sets, termed clusters, which form a lattice. Moreover, each cluster of resynchronizing states is possessed by a set of Boolean functions, which form a subspace of the vector space of all Boolean functions. The presented analysis provides a formal tool to relate finite-memory nonfeedback decoding to the constraint imposed on the input generating source. (Author)

AD-630 521 See Fld. 5/2

AD-630 541 See Fld. 12/1

AD-630 644 See Fld. 18/3

AD-630 683 See Fld. 13/10

AD-630 761 See Fld. 5/2

AD-630 766 See Fld. 8/2

AD-630 783 See Fld. 8/14

AD-630 797 See Fld. 5/2

AD-630 918 See Fld. 5/1

AD-630 981 See Fld. 5/9

AD-630 998 See Fld. 12/1

AD-631 027 See Fld. 9/1

AD-631 071 See Fld. 5/2

AD-631 106 See Fld. 17/9

AD-631 182 See Fld. 5/8

9/3. ELECTRONIC AND ELECTRICAL ENGINEERNG

AD-630 631 Fld. 9/3, 10/2
CFSTI Prices: HC $2.00 MF $0.50
ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS FORT BELVOIR VA
ELECTRIC MOTORS SUPPLIED BY NONSINUSOIDAL VOLTAGES.
Research rept. Jul-Sep 65,
by Richard J. W. Koopman. Jan 66, 40p. Rept. no. 1845,
Proj. DA-1C022001A01201,

Unclassified report

Descriptors: (*Electric motors, Voltage), Inverters, Performance (Engineering), Mathematical models, Programming (Computers)

The report covers a study to represent electric motors on analog computers, with the representation being usable when the motor is supplied by nonsinusoidal voltages. Such a representation is of particular interest when matching characteristics of static inverters and motors powered from them. The computer representation is based on the coupled circuit approach to motor analysis, permitting ready representation of both steady-state and transient phenomena; winding or voltage unbalance; space harmonics; and application of the scheme to a range of types of motors. In order to approach the complexity of the problem gradually, the balanced equivalent two-phase motor with no space harmonics was represented in this study. The report concludes that: (a) Qualitative observations corroborate the correctness of the analog computer representation of the motor which has been derived during this study. (b) The analog computer representation permits calculation of motor performance for applied sinusoidal voltages as well as for nonsinusoidal voltages supplied by inverters. (c) High-accuracy components are necessary for the analog computer representation of the motor. (d) Meaningful quantitative data could not be obtained, primarily because of deficiencies in the computer components. (Author)

AD-631 163 Fld. 9/3, 9/1
CFSTI Prices: HC $1.60 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
HOLLOW BEAM FORMATION IN HIGHLY CONFINED ELECTRON FLOW.
Technical rept.,
by Bruno Zotter. Mar 66, 18p. Proj. DA-1LO-13001-A-91A, Task 1LO-13001-A-91A-23, ECOM 2673

Unclassified report

Descriptors: (*Traveling-wave tubes, Electron beams), (*Electron beams, Electromagnetic properties), Electron guns, Electric fields, Space charges, Cathodes (Electron tube), Equations of motion

The formation of electron beams in low-noise guns for traveling-wave tubes (TWT's) is investigated. The experimentally observed hollowing-out is explained by a simple model which assumes constant voltage along the beam. The derived relationships are then independent of the particular electric fields which cause the beam spreading. In fact, they only relate initial conditions to quantities further downstream where the beam is again in equilibrium flow. By neglecting an extended accelerating region, the calculation of the radial space charge forces may be accomplished. However, this limits the solutions to cases of negligible emission density at the axis, which is otherwise arbitrary across the cathode. Due to the space-charge cloud in the center of the beam and to the strong radial fields at the edge of the cathode, this condition is usually fulfilled in actual TWT guns. In fact, a number of tubes use hollow cathodes which have no emission at the axis. (Author)

AD-631 164 Fld. 9/3, 20/14
CFSTI Prices: HC $1.60 MF $0.50
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J ELECTRONIC COMPONENTS LAB
ON THE ORTHOGONALITY OF ELECTRON BEAM WAVES IN A FINITE MAGNETIC FIELD.
Technical rept.,
by Bruno Zotter. Mar 66, 21p. Proj. DA-1LO-13001-A-91A, Task 1LO-13001-A-91-A-23; ECOM 2678

Unclassified report

Descriptors: (*Electron beams, Space charges), (*Space charges, Propagation), Cyclotron waves, Magnetic fields, Electromagnetic waves, Mechanical waves, Matrix algebra

The concept of two purely longitudinal space-charge waves, which propagate on electron beams in an infinitely high magnetic field, is extended to the case of finite magnetic fields. The existence of four electromechanical waves with both longitudinal and transverse velocity components is shown. An orthogonal combination of these waves is found by simply inverting a 4x4 matrix without requiring the solution of the fourth-order characteristic equation. (Author)

AD-630 566 **See Fld. 11/9**

AD-630 595 **See Fld. 12/1**

AD-630 702 **See Fld. 17/2**

AD-630 812 **See Fld. 17/2**

AD-630 819 **See Fld. 17/9**

AD-630 865 **See Fld. 14/4**

AD-630 900 **See Fld. 17/7**

AD-630 905 **See Fld. 17/2**

AD-630 966 **See Fld. 17/9**

AD-631 050 **See Fld. 14/2**

AD-631 141 **See Fld. 1/4**

9/4. INFORMATION THEORY

AD-630 560 Fld. 9/4, 17/2
CFSTI Prices: HC $2.00 MF $0.50
NEW YORK UNIV N Y LAB FOR ELECTROSCIENCE RESEARCH
THE TRANSMISSION CYCLE PARAMETER IN FEEDBACK COMMUNICATION SYSTEMS.
Technical rept.,
by John J. Metzner, and Kenneth C. Morgan. Nov 65, 36p. Rept. no. Scientific-3,TR-400-126
Contract AF 19 (628)-4321, Proj. AF-4610, Task 461003,
AFCRL 66-22

Unclassified report

Descriptors: (*Communication systems, *Feedback), (*Information theory, Feedback), Data transmission systems, Delay circuits, Timing circuits, Systems engineering

The problem of proper relative timing of the word transmissions from the two ends of a communication feedback system is examined for a number of system configurations. The transmission cycle parameter J is derived as a function of the several system delays and the feedback procedures used. It is shown that the smallest possible value of J can be computed in each situation. Furthermore, the lower bound on J can be attained in some cases by making the times of initiation of code words at the two stations coincide and in all other cases by initiating each word at one station just halfway between the initiation of successive words at the other station. In most circumstances some leeway in the required relative timing exists. (Author)

AD-631 083 Fld. 9/4, 12/1
CFSTI Prices: HC $2.60 MF $0.50
SYLVANIA ELECTRONIC SYSTEMS WALTHAM MASS APPLIED RESEARCH LAB
AN ADAPTIVE HYPERSPHERE DECISION BOUNDARY.
Technical rept.,
by Paul W. Cooper. Mar 66, 29p. Rept. no. RR-492,
Contract AF 30 (602)-3619, Proj. AF-5581, Task 558104,
RADC TR-66-65

Unclassified report

Descriptors: (*Pattern recognition, Adaptive systems), (*Statistical analysis, Pattern recognition), Decision theory, Model theory, Information theory, Combinatorial analysis, Signals, Detection

It was previously shown that the hypersphere decision boundary optimally partitions an n-dimensional sample space when the underlying category probability distributions are of certain types, including spherically symmetric normal and Pearson Types II and VII. Such a model could apply to pattern recognition or to detection of band-limited white stochastic signals. The hypersphere partition arises for distributions differing in their means and in their variances. This paper examines the problem of adaptation, and treats the following two topics: non-supervised adaptation to the optimum hypersphere for normal distributions; supervised estimation of the Pearson shape parameter m, thereby supplementing the partial treatment of estimation in an earlier hypersphere paper. (Author)

AD-630 521 **See Fld. 5/2**

AD-630 562 **See Fld. 17/2**

AD-630 590 **See Fld. 20/6**

AD-630 625 **See Fld. 9/2**

AD-630 777 **See Fld. 17/2**

AD-630 872 **See Fld. 9/5**

AD-630 873 **See Fld. 9/5**

9/5. SUBSYSTEMS

AD-630 597 Fld. 9/5
CFSTI Prices: HC $4.60 MF $0.50
S F D LABS INC UNION N J
DEVELOPMENT OF AN X-BAND CW CROSSED-FIELD AMPLIFIER.
Interim development rept. no. 9, 28 Jun-28 Dec 65,
by J. Hentschel. Mar 66, 46p. Rept. no. SFD-33-IDR-9,
Contract NObsr-89503,

Unclassified report

See also AD-619 577.

Descriptors: (*Crossed field devices, *Microwave amplifiers), X band, Helixes, Gain, Waveguide windows, Radiofrequency power, S band, Coupling circuits, Impedance matching, Bandwidth, Performance (Engineering)

A thermally improved helix coupled vane circuit (HCV) has been scaled for use over the 7 Gc to 11 Gc frequency range. Interaction impedance measurements verify the rapid increase in this parameter with decreased beta and point toward improved operation at lower frequencies. When operated in the conventional manner, a narrow band version of the circuit has operated with 20 db of net gain with a 20 watt peak drive signal but with only 8% efficiency. (Microsecond pulses were used for all tests.) The first test of a reentrant injected beam crossed-field amplifier has resulted in a substantial reduction of all power parameters. With this technique, 10 db of net gain has been measured with the extremely low peak drive signal of 25 mw. (Author)

AD-630 679 Fld. 9/5
CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING
CONSTANT RESISTANCE NONLINEAR TIME-VARYING ONE-PORTS,
by C. A. Desoer, and K. K. Wong. 20 Aug 65, 1p. Contract DA-ARO (D)-31-124-G576 ,NSF-GP-2684
AROD 5177:4

Unclassified report

Availability: Published in Proceedings of the IEEE v53 n11 p1744-5 Nov 1965. Copies to DDC users only.

Descriptors: (*Networks, Electrical impedance), Circuits, Electrical networks, Nonlinear systems, Resistance (Electrical), Resistors

Classes of nonlinear time-varying one-ports are described that are zero-state equivalent to a one-ohm resistor.

AD-630 872 Fld. 9/5, 17/2.1, 9/4
CFSTI Prices: HC $7.60 MF $0.75
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS ANTENNA LAB
HIGH GAIN ANTENNA TECHNIQUES. SYSTEM GAIN-TO-NOISE TEMPERATURE RATIO MEASUREMENTS ON AN ADAPTIVELY PHASED ARRAY.
Interim rept.,
by Delmer D. Hayes. Mar 66, 78p. Rept. no. 1963-1,
Contract AF 30 (602)-3601, Proj. AF-4519 Task 451901,
RADC TR-66-125-vol-1

Unclassified report

Descriptors: (*Antennas, *Phased arrays), Gain, Temperature, Noise (Radio), Signal-to-noise ratio, Microwave equipment, Parabolic antennas, Adaptive systems, Satellite tracking systems

Factors affecting the ultimate sensitivity of a typical microwave receiving system are discussed. It is shown that the receiver noise-temperature and the antenna gain-to-noise-temperature ratio are the dominant parameters in determining system capabilities. Data is presented, along with the technique used to obtain the data, for the receiver noise temperature, the antenna gain, and the antenna noise temperature for each element of the array. An expression is developed for the gain-to-noise-temperature ratio of the array and is shown to be equivalent to an enhancement factor operating on the individual element gain-to-noise-temperature ratio. The effects of system parameter variations are studied and typical values of enhancement factor are claculated. It is concluded that for minor variations in parameters the enhancement factor is affected very little. (Author)

AD-630 873 Fld. 9/5, 17/2.1, 9/4
CFSTI Prices: HC $4.60 MF $0.50
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS ANTENNA LAB
HIGH GAIN ANTENNA TECHNIQUES. AN APPROACH TO THE DESIGN OF THE CASSEGRAIN ANTENNA.
Interim rept.,
by Tsutomu Suzuki. Mar 66, 45p. Rept. no. 1963-5,
Contract AF 30 (602)-3601, Proj. AF-4519, Task 451901,
RADC TR-66-125-vol-2
Unclassified report

See also AD-630 872.

Descriptors: (*Parabolic antennas, *Antenna feeds), Microwave equipment, Monopulse radar, Gain, Temperature, Noise (Radio), Signal-to-noise ratio, Antennas, Experimental design

An evaluation of the design philosophies and procedures of the Cassegrain antenna is presented. An approach to the practical design of and quantitative calculations for the parameters of a Cassegrain antenna to be installed at The Ohio State University Antenna Laboratory are described. (Author)

AD-630 894 Fld. 9/5, 9/1, 13/8
CFSTI Prices: HC $5.00 MF $1.00
RESEARCH TRIANGLE INST DURHAM N C
INTEGRATED SILICON DEVICE TECHNOLOGY, VOLUME VIII. DIODES.
Rept. for Jan 65-Jan 66,
by R. M. Burger. Mar 66, 156p. Contract AF 33 (615)-3306,
ASD TDR-63-316-Vol-8
Unclassified report

See also AD-618 704.

Descriptors: (*Integrated circuits, Silicon), (*Diodes (Semiconductor), Microminiaturization (Electronics), Semiconductor devices, Miniature electronic equipment, Theory, Semiconducting films, Diffusion, Injection, Electrical properties, Failure (Electronics), Manufacturing methods, Doping, Gold, Microwave equipment, Computers, Electronic switches, Frequency multipliers, Current amplifiers

Diodes are discussed as elements in silicon integrated devices. The three main sections treat general theory and properties, the specific properties of integrated device diodes, and innovations and results. Emphasis is placed on explaining diode behavior, on particular integrated structures, and on properties peculiar to integrated diodes. It is concluded that diode behavior is not always explained by simple theory and that increased use of a variety of diode properties in integrated devices is possible. (Author)

AD-631 035 Fld. 9/5, 9/1, 20/1
CFSTI Prices: HC $15.40 MF $1.00
GEORGE WASHINGTON UNIV WASHINGTON D C SCHOOL OF ENGINEERING AND APPLIED SCIENCE
TWO-PORT NETWORK PARAMETERS OF THE PIEZOELECTRIC SEMICONDUCTOR ELECTROACOUSTIC AMPLIFIER,
by Robert M. Moore, and Louis de Pian. 28 Feb 66, 158p. Rept. no. 5,
Contract Nonr-761 (09)
Unclassified report

Descriptors: (*Amplifiers, *Electroacoustic transducers), (*Piezoelectric crystals, *Semiconductor devices), Perturbation theory, Electrical networks, Delay lines, Acoustics, Theory

The electroacoustic amplifier utilizes electron-acoustic interactions in piezoelectric semiconductors. The device has promise as a possible high intensity acoustic source at frequencies in the range where present generation techniques (e.g., high harmonic operation of quartz devices) are of limited utility, and as an amplifier or delay line at microwave frequencies. Its characteristics as a two port network are extremely important. The basic properties of the electron-acoustic interaction are developed and the characteristics of the primary forward and reverse waves are formulated in terms of the electron drift velocity. These results are used, together with the appropriate boundary conditions, to evaluate the two-port network parameters of the electro-acoustic amplifier. Using these network parameters, it is shown that criteria can be developed for the existence of undamped acoustic oscillations, and for the occurence of activity when the device is employed for amplification or delay line application. (Author)

AD-631 040 Fld. 9/5
CFSTI Prices: HC $3.00 MF $0.75
CRUFT LAB HARVARD UNIV CAMBRIDGE MASS
THEORY OF THE BALANCED HELICAL WIRE ANTENNA.
Scientific rept. (Interim),
by Chin-Lin Chen. Jan 66, 80p. Rept. no. Scientific-12 (Series 3),
Contract AF 19 (628)-2406, Proj. AF-5635, Task 563502,
AFCRL 66-120
Unclassified report

See also AD-612 643.

Descriptors: (*Helical antennas, Theory), Geometry, Integral equations, Admittance, Experimental data, Generators, Electric currents, Fourier analysis, Series, Attenuation

A finite, balanced helical wire antenna excited by a delta-function generator is investigated. The geometry of a helical wire is examined and an exact integral equation for the current distribution along the antenna is formulated. For a thin helical wire, the exact integral equation can be approximated by a one-dimensional approximation, which can be solved by a Fourier-series method. In the solution, the logarithmic singularity at the driving point is taken into account and is subsequently substracted out. Thus, the input admittance is obtained. The theoretical results are compared with the experimental result. It is found that the current amplitude decays exponentially. This is contradictory to the usual assumption that the current along a helical antenna is a traveling wave with a constant amplitude. (Author)

AD-631 115 Fld. 9/5, 9/1
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
ON RECIPROCITY AND TIME-VARIABLE NETWORKS,
by B. D. O. Anderson, and R. W. Newcomb. 12 Jul 65, 2p. Contract AF-AFOSR-337-63, AFOSR 66-0197
Unclassified report

See also AD-627 740 and AD-627 741.

Availability: Published in IEEE Proceedings v53 n10 p1674 Oct 1965. Copies to DDC users only.

Descriptors: (*Electrical networks, Theory), Time, Scattering, Matrix algebra, S-matrix, Voltage, Electric currents

Reciprocity of an n-port network is defined by the convolution relationship between the allowed pairs (v,i) of time-domain voltage v and current i n-vectors, with matrix transposition of the v quantities. The definition places symmetry and time-invariance constraints on a scattering matrix. This indicates that some nonreciprocal time-invariant networks are equivalent to time-variable ones constructed only from resistors, inductors, capacitors, and transformers.

AD-631 123 Fld. 9/5, 9/1
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
A CAPACITOR-TRANSFORMER GYRATOR REALIZATION.
by R. W. Newcomb, and B. D. O. Anderson. 2 Aug 65, 2p. Contract AF-AFOSR-337-63, AFOSR 66-0195
Unclassified report

See also AD-631 115.

Availability: Published in IEEE Proceedings v53 n10 p1640 Oct 1965. Copies to DDC users only.

Descriptors: (*Electrical networks, Theory), Time, Scattering, Resistors, Capacitors, Transformers

The question 'Can all linear, finite, nonreciprocal time-invariant networks be realized by time-invariant resistors, capacitors, inductors, and time-varying transformers.' is answered in the affirmative.

AD-631 166 Fld. 9/5, 20/3
LINCOLN LAB MASS INST OF TECH LEXINGTON
MAGNETOSTRICTION EFFECTS IN REMANENCE PHASE SHIFTERS,
by E. Stern, and D. Temme. 25 May 65, 2p.
Rept. no. JA-2572,
Contract AF 19 (628)-5167,
ESD TDR-66-59
Unclassified report

Availability: Published in IEEE Transactions on Microwave Theory and Techniques VMTT13 n6 p873-4 Nov 1965. Copies to DDC users only.

Descriptors: (*Phase shifters, *Magnetostriction), Ferrites, Mechanical properties, Microwaves, Inductance

Microwave garnet and ferrite materials are magnetostrictive. The magnetization of weakly magnetized ferrites and garnets changes as a result of a change of stress or strain in the material. These changes cause a deterioration of device performance. Data is presented showing the effects produced in remanence phase shifter toroids due to applied stress, machining operations, and annealing procedures for representative ferrite samples. (Author)

AD-630 653 See Fld. 5/1

AD-630 674 See Fld. 17/9

AD-630 929 See Fld. 14/2

AD-631 034 See Fld. 9/1

AD-631 054 See Fld. 9/1

AD-631 063 See Fld. 20/14

AD-631 084 See Fld. 17/2

AD-631 106 See Fld. 17/9

AD-631 180 See Fld. 17/9

9/6. TELEMETRY

AD-630 996 Fld. 9/6, 20/8
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
A UNIFIED MULTICHANNEL TELEMETERING SYSTEM FOR THE STUDY OF NUCLEAR RADIATIONS,
by A. A. Bragin, and R. F. Fedoriv. 17 Mar 66, 8p. Rept. no. FTD-TT-65-1889,
TT 66-60994
Unclassified report

Unedited rough draft trans. of Fiziko-Mekhanicheskii Institut. Voprosy Peredachi Informatsii (USSR) n3 p118-21 1964.

Descriptors: (*Telemeter systems, Design), (*Nuclear particles, Telemetering data), Multipath transmission, USSR

Field 10-ENERGY CONVERSION (NON-PROPULSIVE)

10/1. CONVERSION TECHNIQUES

AD-631 038 Fld. 10/1, 9/1
CFSTI Prices: HC $1.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL ENGINEERING
INVESTIGATION OF GERMANIUM DIODES FOR THERMO-PHOTOVOLTAIC ENERGY CONVERTORS.
Supplement to final technical rept. 15 Sep 65-15 Jan 66,
by B. D. Wedlock, Atif Debs, Charles R. Hewes, and Robert Siegel. 15 Jan 66, 11p. Contract DA-44-009-AMC-625 (T)
Unclassified report

See also AD-624 313.

Descriptors: (*Diodes (Semiconductor), *Thermoelectricity), Germanium, Energy conversion, Effectiveness, Photoelectric cells (Semiconductor)

The investigation of PIN thermophotovoltaic energy convertors continuing with emphasis on using evaporation techniques for the fabrication of back surface devices. The techniques have been developed to the point that junctions may be made with less than 5 mils separation. Work is proceeding to improve the lifetimes in the bulk material as a severe degradation at some point in the processing has kept the efficiencies below 1%. This problem is not expected to present important limitations since the techniques used have been utilized by other experimentors without encountering insurmountable difficulties. Planar devices are being fabricated to determine the applicability of the previously proposed theoretical solution. (Author)

AD-631 005 See Fld. 20/9

10/2. POWER SOURCES

AD-630 808 Fld. 10/2, 20/9
CFSTI Prices: HC $11.60 MF $0.75
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
THE VOLT-AMPERE CHARACTERISTICS OF AN ELECTRO-HYDRODYNAMIC GENERATOR.
Master's thesis,
by Harold Peyton Wheeler. Aug 62, 113p. Rept. no. GA/ME/62-8,
Unclassified report

Descriptors: (*Plasma generators, Electric fields), Electrical properties, Voltage, Electric currents, Energy conversion, Fluid flow

The report details the investigation of an electrohydrodynamic generator in which a moving flow of air carries ions against an electric field by viscous interaction, extracting energy from the flow and converting it to electric energy. The purpose of the investigation is to demonstrate the feasibility of such energy conversion, to observe the effects of generator geometry and flow conditions, and to compare observed performance with a theoretical analysis. (Author)

AD-631 037 Fld. 10/2
CFSTI Prices: HC $1.10 MF $0.50
MINNESOTA MINING AND MFG CO ST PAUL THERMOELECTRIC PRODUCTS
300 WATT PORTABLE THERMOELECTRIC GENERATOR.
Monthly progress rept. no. 13, 31 Mar 66,
by T. L. Nystrom. 31 Mar 66, 5p. Contract N600 (61533)62758,
Unclassified report

See also AD-612 602.

Descriptors: (*Thermoelectricity, Power supplies), (*Generators, Thermoelectricity), (*Electric power production, Thermoelectricity), Portable, Thermocouples, Noise, Anechoic chambers

The system design was modified to reduce the dry weight to 25 pounds and to improve the reliability of the hermetic seal. The generator system was started and operated outdoors when the wind was 17 mph gusting to 25 mph. Noise level tests were conducted on the system in an anechoic chamber. The maximum broad band sound pressure level is 52 db at a distance of 50 feet. (Author)

AD-630 567 See Fld. 17/2

AD-630 631 See Fld. 9/3

10/3. ENERGY STORAGE

AD-630 640 Fld. 10/3
CFSTI Prices: HC $4.60 MF $0.50
EAGLE-PICHER CO JOPLIN MO COUPLES DEPT
INVESTIGATIONS LEADING TO THE DESIGN AND DEVELOPMENT OF MAGNESIUM/MAGNESIUM PERCHLORATE BATTERIES.
Quarterly rept. no. 1, 1 Nov 65-31 Jan 66,
by James R. Sharpe. 28 Feb 66, 43p. Contract DA-28-043-AMC-01763 (E), Proj. DA-1C6-22001-A-053, Task 1C6-22001-A-05302,
Unclassified report

Descriptors: (*Batteries + components, Design), (*Magnesium compounds, Cathodes (Electrolytic cells)), (*Cathodes (Electrolytic cell), Magnesium compounds), Magnesium, Mercury compounds, Perchlorates, Dioxides, Freezing point depression, Performance (Engineering), Primary cells

The report describes the significant accomplishments made on the research and development of magnesium/ magnesium perchlorate batteries. Data are presented concerning electrical characteristics from -40F to +125F of magnesium/mercuric oxide six-cell batteries at low, medium and high rates. The variation of freezing point depression within the concentration range of 1 N. to 6 N. magnesium perchlorate was determined experimentally. Preliminary tests on manganese dioxide cathodes showed promise that further development can produce low cost cathodes with the same or better energy output as the costly mercuric oxide depolarizer. (Author)

AD-630 691 Fld. 10/3
CFSTI Prices: HC $9.60 MF $0.75
ELECTRIC STORAGE BATTERY CO YARDLEY PA
HIGH ENERGY SYSTEM (ORGANIC ELECTROLYTE).
Quarterly rept. no. 2, 15 Sep-15 Dec 65,
by D. P. Boden, H. R. Buhner, and V. J. Spera. Jan 66, 99p. Contract DA-28-043-AMC-01394 (E), Proj. 1C622001A053, Task 1C622001A053-02,
ECOM 01394-2
Unclassified report

See also AD-628 961.

Descriptors: (*Batteries + components, Organic materials), (*Wet cells, Organic materials), (*Electrolytes, Organic materials), Organic solvents, Purification, Propenes, Cathodes (Electrolytic cell), Solubility, Copper compounds, Fluorides, Binders, Polyethylene plastics, Particle size, Thermal properties, Electroforming, Anodes (Electrolytic cell), Lithium, Material forming, Battery separators, Asbestos

The study of high energy density systems included: investigation of new electrolyte solvents; development of a technique for purifying propylene carbonate and other solvents; continued studies of corrosion and solubility of anode and cathode materials in various electrolytes; investigation of the effect of various fabrication and operating parameters on cathode performance; development of Li anode fabrication methods; and construction and testing of compact Li/CuF2 cells.

Field 11-MATERIALS

11/1. ADHESIVES AND SEALS

AD-630 744 Fld. 11/1, 7/4, 11/10
CFSTI Prices: HC $1.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
CERTAIN FACTORS DETERMINING THE FORMATION OF CHEMICAL BONDS ON THE BORDER OF ADHESIVE COMPOUND AND SUBSTRATE,
by I. L. Shmurak. 1966, 7p. Rept. no. Translation-2129,
TT 66-60933
Unclassified report

O Nekotorykh Faktorakh, Opredelyaiushchikh Vozniknovenie Khimicheskikh Svyazei na Granitse Razdela Adgeziv-Substrat, trans. of Kauchuk i Rezina (USSR) v24 n9 p23-6 1965.

Descriptors: (*Adhesives, *Chemical bonds), (*Rubber, Adhesion), (*Bonding, Chemical properties), Elastomers, Electrical properties, Polymerization, Surfaces, Fibers (Synthetic), Rayon, Tires, USSR

High adhesive strength in polymer systems can be achieved by interpolymerization on the adhesive-substrate interface through the interaction of functional groups of polymers of the adhesive and substrate. The realization of onium interpolymerization, taking place at a low energy of variations and not resulting in the separation of side products on the interface of the adhesive-substrate, made it possible to increase substantially the adhesive strength in a rubber-cord system. (Author)

11/2. CERAMICS, REFRACTORIES, AND GLASSES

AD-630 776 Fld. 11/2
CFSTI Prices: HC $3.00 MF $0.75
AVCO CORP WILMINGTON MASS SPACE SYSTEMS DIV
MICROSTRUCTURE STUDIES OF POLYCRYSTALLINE REFRACTORY OXIDES.
Summary rept., 25 Mar 65-24 Mar 66,
by William H. Rhodes, David J. Sellers, ThomasVasilos, Arthur H. Heuer, and Robert Duff. 24 Mar 66, 79p. Contract NO2-65-0316-f, Proj. WR-007-02-01,
Unclassified report

Descriptors: (*Refractory materials, Microstructure), (*Aluminum compounds, Oxides), (*Magnesium compounds, Oxides), Mechanical properties, Surfaces, Strength, Fracture (Mechanics), Heat treatment, Hot working, Additives, Silicon compounds, Dioxides, Silicates, Ceramic materials

The effect of surface structure on the transverse bend strength of polycrystalline Al2O3 and MgO was studied. A consistent relationship between strength and improved surface structure was at-

tained for MgO tested at 77K while such a relationship did not exist for testing at 296K. In Al2O3, the strength-surface structure relationships were not consistent although several thermal cycles strengthened this material at both 77K and 296K by approximately 40%. Hot forging achieved crystallographic and/or mechanical texturing in polycrystalline MgO and Al2O3. Specimens were obtained which in the case of Al2O3 showed strengths at 23C and 1300C between 25% and 200% higher than would be predicted from existing grain size - porosity - strength relations. The bend strengths for forged MgO were equivalent to hot pressed material having a similar microstructure. SiO2 additions caused a marked weakening of Al2O3, while MgO additions gave specimens which were similar to or perhaps slightly stronger than unalloyed specimens. The magnesia addition increased the high temperature ductility and lowered the brittle-ductile transition temperature by approximately 50C. The strongest MgO specimen reported to date, 55,000 psi, was achieved by what appears to be a compressive surface layer of Mg2SiO4. (Author)

AD-630 833 Fld. 11/2, 20/11
CFSTI Prices: HC $2.60 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
MOISTURE ASSISTED SLOW CRACK EXTENSION IN GLASS PLATES.
Memo rept.,
by G. R. Irwin. 28 Jan 66, 28p. Rept. no. NRL-MR-1678,
Proj. SR-007-03-04-1008 ,SF-013-10-03-0217

Unclassified report

A-Report of Studies Conducted at Ernst Mach Institute, Freiburg, W. Germany, 6 May - 3 August 1965.

Descriptors: (*Glass, Fracture (Mechanics)), (*Fracture (Mechanics), Moisture), Stres. s, Structural properties, Water, Monomolecular films, West Germany

Exploratory studies of moisture assisted stable (slow) crack extension in a 4mm thickness plate glass were made. It was found that satisfactory control of crack orientation could be obtained using a double cantilever type specimen if the total angle bisected by the crack was as large as 90 degrees. No side grooves or guiding scratches were required or used. Trials were made at room temperature using 50 percent relative humidity, dessicated air, and saturated air. The 'moist' test results were difficult to interpret. The remaining results suggest that, for a fixed stress level near the crack, the water assisted crack speed is nearly proportional to the water content of the air. The restricted mobility of water molecules between glass surfaces less than 50 A apart is the dominating influence controlling shape of the response curves (crack speed as a function of stress field force). The crack speed magnitude and the leveling of crack speed prior to onset of fast fracture are closely related to compositional and structural aspects of the glass. (Author)

AD-630 914 Fld. 11/2, 20/13, 7/4
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
THE THERMODYNAMICS OF THE MAGNESIA/MAGNESIUM-OXYGEN VAPOR SYSTEM,
by F. J. Krieger. Mar 66, 34p. Rept. no. RM-4943-PR,
Contract AF 49 (638)-1700,

Unclassified report

Descriptors: (*Ablation, Thermodynamics), (*Magnesium compounds, Oxides), (*Magnesium, Thermodynamics), (*Oxygen, Thermodynamics), Ceramic materials, Vapors, Chemical equilibrium, Phase studies, Enthalpy, Entropy, Temperature, Pressure, Molecular weight, Tables

The purpose of this study is the thermodynamic investigation of magnesia, MgO, over a range of temperatures up to 6000K and pressures up to 1000 atmospheres. Two sets of equilibrium composition equations are used --one representing a pure gas phase, the other a heterogeneous system of gas and condensed (i.e., solid or liquid) magnesia. The gas phase of the heterogeneous chemical system, like the homogeneous gas phase, comprises 7 gaseous magnesium-oxygen species. The results of the computational program are presented in both tabular and graphic form. The latter is a conventional Mollier diagram in which specific enthalpy is plotted against specific entropy, with cross plots of temperature, pressure, and molecular weight or moles of condensed magnesia. (Author)

AD-630 980 Fld. 11/2, 20/13, 7/4
NATIONAL BUREAU OF STANDARDS WASHINGTON D C
HEAT CAPACITY AND ENTHALPY MEASUREMENTS ON ALUMINUM CARBIDE (AL4C3) FROM 15 TO 1173K. THERMODYNAMIC PROPERTIES FROM 0 TO 2000K,
by George T. Furukawa, Thomas B. Douglas, William G. Saba, and Andrew C. Victor. 18 May 65, 18p.
AFOSR 66-0626

Unclassified report

Availability: Published in Journal of Research v69A n5 p423-38 Sep-Oct 1965. Copies to DDC users only.

Descriptors: (*Refractory materials, Thermal properties), (*Aluminum compounds, Carbides), (*Carbides, Thermodynamics), Specific heat, Enthalpy, Heat of formation, Vapors, Chemical equilibrium, Calorimetry

Measurements of the heat capacity and relative enthalpy were made on aluminum carbide (Al4C3) from 15 to 1173K. The thermodynamic properties were calculated up to 2000K from the data by judicious extrapolation above 1173K. In conjunction with the heat-of-formation data on Al4C3 obtained by King and Armstrong and by Mah, second- and third-law analyses were made of the thermodynamics of several high-temperature vapor -equilibrium reactions involving Al4C3. (Author)

AD-630 549 See Fld. 7/2

AD-630 600 See Fld. 11/4

11/3. COATINGS, COLORANTS, AND FINISHES

AD-630 848 Fld. 11/3
CFSTI Prices: HC $2.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
CORROSION PROTECTION BY COLD PHOSPHATIZATION,
by V. S. Lapatukhin. Jan 66, 21p. Rept. no. FSTC-HT-23-24-66,
Proj. 2301-6553,
TT 66-60953

Unclassified report

Trans. of Zhurnal Prikladnoi Khimii (USSR) v24 n4 p373-82 1951.

Descriptors: (*Phosphate coatings, *Corrosion inhibition), Iron, Steel, Fluorides, pH, Zinc compounds, Phosphates, Temperature, Low-temperature research, USSR

Following a discussion of the shortcomings of the hot method of coating iron and steel with a phosphate solution for protection against corrosion, the author describes a method of cold phosphatization involving the use of zinc dihydrophosphate, fluorine compounds, and accelerators to decrease free acidity and promote depolarization of the hydrogen liberated by phosphatization. The high corrosion resistance and strength of the phosphate coatings were demonstrated in laboratory and industrial tests. (Author)

AD-630 908 Fld. 11/3, 7/3, 7/5, 15/7
CFSTI Prices: HC $4.00 MF $0.75
AMERICAN CYANAMID CO BOUND BROOK N J
SYNTHESIS OF CHROMOTROPIC COLORANTS.
Technical rept. Apr 64-Apr 65,
by Ralph A. Coleman, Walter H. Foster,Jr., John-Kazan, and Marion Mason. Feb 66, 113p. Contract DA-19-129-AMC-269 (N), Proj. DA-1K0-24401-A113,
ANL 66-9-CM ,ANL TS-138

Unclassified report

Descriptors: (*Camouflage, Dyes), (*Dyes, Synthesis (Chemistry)), (*Nylon, Coloring), Metalorganic compounds, Organic sulfur compounds, Mercury compounds, Zinc compounds, Palladium compounds, Substitution reactions, Textiles, Photosensitivity, Stability, Absorption spectrum

In a study of photochromic colorants potentially useful for a 'chameleon' type camouflage system, a number of metal dithizonates were synthetically modified by introduction or groups in the ortho, meta and para positions of both phenyl rings of dithizone. The resulting complexes were tested for spectral, photochromic and lightfastness properties. While spectral changes and increases in both solubility and lightfastness were affected by some ortho substituents, the photochromic properties (photostationary conversion and thermal return rate) were only slightly affected by substitution. The complexes of mercury exhibit the best all-round performance although some zinc complexes approach the performance of mercury. The complexes of palladium exhibit potentially useful spectral and photochromic behavior that is quite different from the mercury type complexes and more application research is recommended regarding the incorporation of these palladium complexes in textile fibers. Fiber reactivity (on nylon) has been introduced into the mercury dithizonate system via a dichlorotriazinyl reactive group. This compound exhibited photochromic properties when reacted with nylon (Author)

AD-630 705 See Fld. 13/8

AD-630 743 See Fld. 13/8

AD-631 171 See Fld. 11/6

AD-631 174 See Fld. 13/8

11/4. COMPOSITE MATERIALS

AD-630 600 Fld. 11/4, 11/2, 13/13
CFSTI Prices:MF $0.75
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
LABORATORY INVESTIGATION OF PLASTIC-GLASS FIBER REINFORCEMENT FOR REINFORCED AND PRESTRESSED CONCRETE. REPORT I. PLAIN REINFORCED CONCRETE,
by J. C. Wines, and G. C. Hoff. Feb 66, 61p.
Rept. no. Miscellaneous paper-6-779,

Unclassified report

Availability: Available from U. S. Army Engineer Waterways Experiment Station, Corps. of Engineers, Vicksburg, Miss., $0.75.

Descriptors: (*Reinforced concrete, Glass textiles), (*Glass textiles, Reinforcing materials), Rods, Structural properties, Beams (Structural), Mechanical properties, Performance (Engineering)

The investigation consisted of the evaluation of plastic -glass fiber elements, commonly called fiber glass, that could be used as plain reinforcement in concrete members and the design of concrete

members to utilize the properties of the fiber-glass elements. Fiber-glass rods were tested for tensile strength, long-duration load, and elasticity and bond in concrete. Utilizing these essential properties, concrete beams were designed with fiber - glass rods as the tension elements. The fiber-glass reinforced concrete beams were compared both experimentally and analytically with similarly designed steel reinforced concrete beams on the basis of ultimate flexural strength, deflection, and long-duration load. The low modulus of elasticity of the fiber-glass rods together with the lack of a good bond between the rods and the concrete, caused the neutral axis of the beam to move up, thus reducing the compression area of the beam. The beams then failed in compression before the fiber-glass reinforcement could be fully utilized. While ineffective as plain reinforcement in concrete beams, fiber-glass rods, with their low modulus of elasticity and high strength, theoretically show promise if used as tension elements for prestressing concrete by the pretensioning method. (Author)

AD-630 884 Fld. 11/4, 20/11
FOREST PRODUCTS LAB MADISON WIS
FATIGUE CHARACTERISTICS OF TWO NEW PLASTIC LAMINATES, REINFORCED WITH UNWOVEN 'S' GLASS FIBERS, UNDER CYCLIC AXIAL OR SHEAR LOADING,
by Kenneth H. Boller. Mar 66, 37p. Contract AF 33 (615)-65-5002, Proj. AF-7381, Task 738106,
AFML TR-66-54
Unclassified report

Availability: Published in Reprint. Copies to DDC users only.

Descriptors: (*Laminated plastics, Fatigue (Mechanics)), (*Reinforcing materials, *Glass textiles), Loading (Mechanics), Binders, Stresses

The report presents the fatigue characteristics of plastic laminates made of two new resin systems reinforced with unwoven 'S' glass fibers. This knowledge adds to the data that have already been generated to evaluate the fatigue properties of typical laminates. The results show that by incorporating stronger resins to bind the fiber bundles the axial fatigue life of a laminate is increased. For example: the number of median life cycles at 54,000 pounds per square inch for crossply constructions was increased from 3,000 to 53,400, and at 40,000 pounds per square inch it was increased from 17,850 to 659,250 when shear strengths of the resin systems were changed small amounts from 8,800 to 9,320 pounds per square inch or 4,740 to 4,880 pounds per square inch, depending on method of test. Another example: the number of median life cycles at 75,000 pounds per square inch for a plus or minus 5 degrees construction was increased from 7,500 to 18,500 cycles when shear strength only changed from 10,620 to 11,120 pounds per square inch. (Author)

AD-630 987 **See Fld. 11/9**

11/5. FIBERS AND TEXTILES

AD-631 001 **See Fld. 11/9**

AD-631 078 **See Fld. 8/1**

11/6. METALLURGY AND METALLOGRAPHY

AD-630 563 Fld. 11/6
CFSTI Prices: HC $2.60 MF $0.50
NAVAL ENGINEERING EXPERIMENT STATION ANNAPOLIS MD
FATIGUE AND NOTCH BEND PROPERTIES OF HIGH-STRENGTH ALUMINUM ALLOYS.
Research and development rept.
24 Jul 62, 21p. Rept. no. NAVENGRXSTA-910163C,
Task 0701,
Unclassified report

Descriptors: (*Aluminum alloys, Mechanical properties), (*Fracture (Mechanics), Aluminum alloys), (*Fatigue (Mechanics), Aluminum alloys), Deformation, Brittleness, Tests, Enverонmental tests, Experimental data, Corrosion, Sensitivity, Loading (Mechanics)

An investigation was made of the mechanical properties of high-strength, structural aluminum alloys produced in heavy sections. Although tensile strengths of the alloys ranged from 40,000 to 75,000 psi, little difference in fatigue and corrosion fatigue properties was found among alloys on the basis of a 10,000,000 cycle life. Tests run to 100,000,000 cycles indicated some superiority for the lower strength alloys of the group. Notch bend tests, with specimens up to 3 in. sq, were conducted with alloys 5456-H321, 6061-T6, and 7079-T6 as a means of evaluating notch behavior and susceptibility to brittle fracture. The results demonstrated a marked decrease in fracture stress under conditions causing brittle fracture in alloy 7079. It is concluded that the notch bend tests, correlated with energy release rate concepts of brittle fracture propagation, offer a better approach to the study of notch behavior in these alloys than the more conventional impact tests. (Author)

AD-630 572 Fld. 11/6, 20/2
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF PHYSICS
INITIAL OXIDATION OF TANTALUM OBSERVED IN A FIELD ION MICROSCOPE,
Technical rept.,
by Shogo Nakamura, and Erwin W. Muller. 10 Jun 65, 11p. Rept. no. TR-8,
Contract Nonr-656 (23), Proj. NR-017-443,
Unclassified report

Availability: Published in Journal of Applied Physics v36 n11 p3634-41 Nov 1965. Copies to DDC users only.

Descriptors: (*Tantalum, Oxidation), Microscopy, Diffusion, Oxygen, Crystal lattice defects, Heat of activation

The distribution of oxygen atoms diffused into a tantalum crystal as a function of temperature, oxygen pressure, and time has been observed in a field ion microscope. Light oxidation below 450K causes corrosion of the first atomic layer only, while there is no diffusion into the matrix. The distribution of oxygen interstitials occuring at higher temperature with an activation energy of 1.1 eV is measured by direct counting of surface concentration of interstitials using the field evaporation sectioning technique. Heavy oxidation causes a breakup of the lattice and homogeneously dispersed nuclei of oxide. Tantalum with 1% oxygen content only shows the statistically expected number of interstitial pairs when quenched from 1100K. In situ annealing between 395 and 360K causes up to 14.5% of the interstitials to associate in pairs or clusters. (Author)

AD-630 661 Fld. 11/6
CFSTI Prices: HC $3.00 MF $0.75
MARTIN CO BALTIMORE MD
RELATIONSHIP OF SURFACE EFFECTS TO THE MECHANICAL BEHAVIOR OF METALS.
Technical summary rept., 1 Feb-30 Jul 65,
by I. R. Kramer. Jan 66, 77p. Contract AF 33 (657)-10509, Proj. AF-7353, Task 735303,
AFML TR-66-2
Unclassified report

Descriptors: (*Metals, Mechanical properties), (*Aluminum, Mechanical properties), (*Iron, Mechanical properties), Surfaces, Deformation, Crystal lattice defects, Strain (Mechanics), Stresses, Shear stresses, Single crystals, Plasticity, Heat of activation, Vacuum

The role of the surface is discussed in terms of its effect on the mechanical behavior of metals. There is adequate evidence which demonstrates that a region of high dislocation concentration exists in the region at the surface of a deformed metal. This dislocation rich layer impedes the movement of mobile dislocations. It was shown in aluminum by means of strain rate cycling tests that for a given applied stress, the average velocity of the dislocations is affected by the surface. It appears possible to explain the surface effects in terms of stress field associated with the surface layer. For aluminum crystals additional internal dislocation barriers were not formed in Stage I and it was possible to show that Stage I ends when the difference between the applied stress and the surface stress on the secondary slip system equals the critical resolved shear stress. The effect of the surface was found to be greater on polycrystalline specimens than on single crystals. For Armco iron, the surface stress was almost twice as great as that due to internal obstacles. It is also shown that the yield point in high purity metals is associated with the surface layer. (Author)

AD-630 771 Fld. 11/6
CFSTI Prices: HC $1.00 MF $0.50
ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS MATERIALS RESEARCH DIV
EVALUATION OF REFRACTORY SHEET METALS -PART II.
Technical rept.,
by George E. Gazza, and Thomas S. DeSisto. Oct 65, 12p. Proj. D/A-1C024401A110,
AMRA TR-65-25
Unclassified report

See also AD-608 164.

Descriptors: (*Sheets, Refractory metal alloys), (*Tantalum alloys, Mechanical properties), (*Molybdenum alloys, Mechanical properties), (*Tungsten alloys, Mechanical properties), Stresses, Rupture, Tensile properties, Loading (Mechanics), Bending

Four tantalum base alloys, one molybdenum base alloy, and one tungsten base alloy were evaluated. Mechanical properties were obtained by tensile testing at temperatures to 3500 F, stress-rupture testing to 3000 F, and bend testing to -320 F. A comparison shows that generally the mechanical properties obtained for each alloy approach or exceed the target properties established by the Alloy Requirements and Selection Group. (Author)

AD-630 814 Fld. 11/6, 13/8
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
MEASURING METALLIC CORROSION BY RADIATION BACKSCATTERING AND RADIATION INDUCED X-RAYS.
Technical research article,
by Sigmund Berk. Nov 65, 8p. Rept. no. A65-11,
Proj. DA-1C024401A328,
Unclassified report

Availability: Published in Materials Protection v4 n11 p39-41 Nov 1965. Copies to DDC users only.

Descriptors: (*Corrosion, *Non-destructive testing), Backscattering, Beta particles, X rays, Nuclear industrial applications, Nickel, Niobium, Tantalum, Copper, Steel, Brass, Oxides, Thickness, Radiation measurement systems

A Pm-147 beta-backscattering device was used to determine the relative amount of corrosion on several metallic specimens. The method was found effective in measuring extent of oxidation or corrosion of nickel, niobium, and tantalum. A brief description of a beta-particle induced x-ray method for measuring corrosion of copper, steel, and brass is also described. (Author)

AD-630 871 Fld. 11/6, 14/2, 20/11
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
STARTER CRACKS FOR FRACTURE TOUGHNESS TESTING BY A RESONANCE FATIGUE TECHNIQUE.
Final memo rept.,
by M. R. Achter, H. H. Smith, and P. Shahinian.
Mar 66, 9p. Rept. no. NRL-MR-1680,
Proj. RR-007-01-46-5407,
Unclassified report

Descriptors: (*Steel, Toughness), (*Toughness, Test methods), (*Fracture (Mechanics), Test methods), Vibrators (Mechanical), Fatigue (Mechanics), Resonance, Test equipment, Automatic

A technique was developed for introducing fatigue cracks of a predetermined size automatically in specimens using a reverse bending resonance machine. The drop in the resonant frequency of vibration reflects the growth of cracks and it is by means of the change in frequency that the size of cracks is controlled. This technique has applicability in mechanical testing in which are required specimens containing pre-existing flaws or cracks, such as fracture toughness testing, and in studies of crack propagation. (Author)

AD-630 923 Fld. 11/6, 20/11, 18/8
CFSTI Prices: HC $8.60 MF $0.75
BROWN UNIV PROVIDENCE R I DIV OF ENGINEERING
NEUTRON IRRADIATION AND THE YIELD SURFACES OF COPPER.
Technical rept.,
by T. D. Dudderar, and J. Duffy. Jan 66, 86p.
Rept. no. TR-48,
Contract Nonr-562 (20), Proj. NR-064-424,
Unclassified report

Descriptors: (*Copper, Mechanical properties), (*Radiation damage, Copper), (*Creep, Copper), Neutron beams, Surface properties, Deformation, Strain (Mechanics), Crystals

Tests were conducted to determine the effects of irradiation and plastic deformation on the yield surfaces of polycrystalline copper. It was found that the principal effect of plastic deformation on unirradiated copper was to translate the yield surface without appreciably changing its size or shape. Irradiation, on the other hand, produced a very large change in the overall size of the initial yield surface; in other words, it produced an effect phenomenologically similar to extensive isotropic strain-hardening. In addition, the shape of the initial yield surface after irradiation was dependent on the plastic strain offset chosen to define yield. This effect was not observed for the unirradiated metal. Extensive plastic deformation after irradiation caused the yield surface to translate and grow smaller without significantly changing shape. (Author)

AD-630 949 Fld. 11/6, 20/2
CFSTI Prices: HC $2.00 MF $0.50
MARTIN CO BALTIMORE MD
EFFECT OF SURFACE ON THE MECHANICAL PROPERTIES OF METALS.
Summary rept. 1 Feb-31 Oct 65,
by Irving R. Kramer. Jan 66, 49p. Contract AF 33(657)-10509, Proj. AF-7353, Task 735303, AFML TR-66-4
Unclassified repor

Descriptors: (*Surface properties, Metals), (*Metals, Mechanical properties), (*Aluminum, Mechanical properties), (*Iron, Mechanical properties), Single crystals, Shear stresses, Molybdenum, Fatigue (Mechanics), Yield point, Deformation, Ductility, Brittleness, Strain (Mechanics)

Measurements were made on single crystal and polycrystalline specimens of high purity aluminum and Armco iron to determine: the net shear stress acting on mobile dislocations, t*; the stress due to internal obstacles opposing the motion of the mobile dislocations, t (i); and the stress associated with the dislocation rich surface layer, t (s). For aluminum single crystals, t (i) is 0 in Stage I and increases rapidly in Stages II and III. For the polycrystalline aluminum, t (i) increases at the onset of deformation. Compared to the plastic stress, t (p), the stress ratios t*/t (p), t (i)/t (p) and t (s)/t (p) are the same for single and polycrystalline aluminum at the same strain in Stages II and III. The surface stress for iron and molybdenum is much larger than that for aluminum. A preliminary investigation on molybdenum indicates that as the ratio of the surface to the plastic stresses in a direction normal to the cross section of the specimen approaches 1, the specimen becomes brittle. It also appears that the fatigue mechanism may be studied by the change in yield point due to the surface layer. Measurements before and after cyclic stressing show that the surface stress and the effect of internal obstacles are not influenced by the cycling phase. (Author)

AD-630 959 Fld. 11/6, 20/2
CURTISS-WRIGHT CORP WOODRIDGE NJ
MICROYIELDING IN IRON AT LOW TEMPERATURES.
Revised ed.,
by R. Kossowsky, and N. Brown. 28 Jun 65, 10p.
Unclassified report

Prepared in cooperation with Pennsylvania Univ., Philadelphia, Pa. Revision of manuscript submitted 22 Mar 65.

Availability: Published in Acta Metallurgica v14 p131-9 Feb 1966. Copies to DDC users only.

Descriptors: (*Iron, Deformation), Yield point, Stresses, Low-temperature research, Strain (Mechanics), Zone melting, Crystal lattices, Creep

The micro and macro-yielding of zone refined polycrystalline iron was investigated between 298 and 5K. The elastic limit of 5000 psi at 298K did not increase until the temperature was below about 50K; the value at 5K was 10,000 psi. The stress to produce a permanent strain of 1,000,000, sigma, increased by 8,000 to 10,000 psi in going from 298K to 5K. Sigma did not change with a five fold change in strain rate. The macro-yield point of prestrained material increased by 120,000 psi between 298 and 5K. The elastic limit was associated with the stress to move existing edge kinks against a Peierls -Nabarro force and also against impurities. Sigma was connected with another Peierls-Nabarro force which resists the motion of screw dislocations with impurities making an additional contribution. The difference between sigma and the flow stress has been, in part, attributed to a difference in plastic strain rate at which each stress is measured. In addition, a different Peierls-Nabarro force may control the flow stress. (Author)

AD-630 971 Fld. 11/6, 14/2
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
CALIBRATION OF THE VR-5/20 THERMOCOUPLE TO CRITICAL POINTS UP TO 3000C. DETERMINATION OF THE MELTING POINTS OF VANADIUM AND NIOBIUM OF HIGH PURITY,
by Yu. A. Kocherzhinskii, G. F. Kobzenko, V. M. Pan, V. K. Sviridenko, and L. M. Yunko. 17 Mar 66, 6p. Rept. no. FTD-TT-65-1888, TT 66-60987
Unclassified report

Unedited rough draft trans. of Akademiya Nauk URSR, Kiev. Instytut Metalofizyky. Sbornik Nauchnykh Rabor. v17 p209-10 1963.

Descriptors: (*Thermocouples, Calibration), (*Vanadium, Melting point), (*Niobium, Melting point), Determination, USSR

AD-630 974 Fld. 11/6
CFSTI Prices: HC $1.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
CORROSION STUDY XXIV. THE INFLUENCE OF TEMPERATURE ON THE PASSIVATION CHARACTERISTICS OF STAINLESS STEELS,
by M. Prazak, and J. Spanily. 17 Mar 66, 15p.
Rept. no. FTD-TT-65-1223,
TT 66-60990
Unclassified report

Korrosionsstudium XXIV. Einfluss der Temperatur auf die Passivierungs-Charakteristik Korrosions -bestandiger Stahle, edited trans. of Collection of Czechoslovak Chemical Communications, v25 p2828-37 1960. See also Technical Translation-60-18750.

Descriptors: (*Stainless steel, Corrosion), Corrosion resistance, Corrosion inhibition, Temperature, Chromium alloys, Nickel alloys, Heat of activation, Czechoslovakia

The temperature dependence of the corrosion reaction in the range of the critical passivation current, in the range of passivity, transpassivity, and of secondary passivity were determined for two typical chrome-nickel stainless steels; the dependences were quantitatively expressed by the Arrhenius equation. Certain conceptions of the mechanism of the processes concerned were built up on the basis of the activation-energy values of the respective reactions. From the results it can be seen that the corrosion, in a passive state, rises very steeply with increasing temperature (in the range of 20 - 210 C in a ratio of 1:10,000,000), so that it may become technically significant in the case of higher temperatures. The stability of the passive state and the passivation tendency of the material decrease with equal rapidity with increasing temperature. It has been found that the effectiveness of corrosion inhibition by means of passivating inhibitors decreases as a result of this. (Author)

AD-630 984 Fld. 11/6, 20/12
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
DETERMINATION OF QUANTITATIVE POLE FIGURES FOR FLAT THIN FILMS ON A SUBSTRATE.
Technical research article,
by Milton E. Schwartz. 1 Jul 65, 9p. Proj. DA-1C014501B32A
FA A66-1
Unclassified report

Prepared in cooperation with Franklin Inst. Research Labs., Philadelphia, Pa.

Availability: Published in Transactions of the Metallurgical Society of AIME v236 p226-8 Feb 1966. Copies to DDC users only.

Descriptors: (*Metal films, *X-ray diffraction analysis), (*Gold, Films), Crystal structure, Polarization, Glass, X rays, Scattering, Absorption

A method for the determination of quantitative pole figures for flat thin films with a substrate backing is described. Mathematical expressions which correct for x-ray scattering and absorption of the substrate are derived for various geometries of the sample. The technique is verified by comparing corrected x-ray data from beaten gold both with and without a glass substrate. Data for a (200) pole figure for beaten gold are presented. (Author)

AD-630 992 Fld. 11/6
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
CAST AUSTENITIC NON-NICKEL STEEL,
by N. P. Aleksandrova. 17 Mar 66, 6p. Rept. no. FTD-TT-65-1398,
TT 66-60996
Unclassified report

Unedited rough draft trans. of Mashinostroenie (USSR) n5 p35-6 1964.

Descriptors: (*Austenite, *Stainless steel), (*Chromium alloys, Stainless steel), (*Manganese alloys, Stainless steel), Casting alloys, Nitrogen, Solubility, USSR, Mechanical properties, Chemical properties

A cast austenitic nonnickel stainless chrome-manganese steel alloyed by nitrogen was developed. The determination of the optimal amount of nitrogen for the alloying corresponding to its solubility in the alloy is based on the use of the dependence of the coefficient of activity of the nitrogen on the concentration of the alloying elements in the alloy on an iron base.

AD-631 153 Fld. 11/6, 20/11
CFSTI Prices: HC $1.60 MF $0.50
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD
THE NOTCH-BEND STRENGTH OF NONFERROUS ALLOYS IN HEAVY SECTIONS.
Research and development phase rept.,
by H. P. Chu, and A. J. Skalican. Mar 66, 19p.
Rept. no. MEL-88/66,
Proj. S-F020-01-05, Task 0852,
Unclassified report

Descriptors: (*Alloys, Notch toughness), (*Copper alloys, Notch toughness), (*Nickel alloys, Notch toughness), (*Aluminum alloys, Notch toughness), Bending, Yield point, Fracture (Mechanics), Brittleness, Failure (Mechanics)

The notch-bend strength of ten nonferrous alloys was determined. Four-inch-square specimens of seven cast copper-base alloys and a cast nickel-copper alloy showed extensive yielding prior to fracture. Similar specimens of wrought 7075-T6 and extruded 2024-T4 aluminum alloys failed in a brittle manner. It is concluded that the seven cast copper-base alloys and the cast nickel-copper alloy are notch tough and thus not prone to brittle fracture in air when used in sections up through 4 inches thick. (Author)

AD-631 171 Fld. 11/6, 11/3
CFSTI Prices: HC $2.00 MF $0.50
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C
OPTICAL STUDIES ON ANODIC OXIDE FILMS ON ALUMINIUM (I/II),
by Tajima Sakae. Apr 66, 31p. Contract DA-44-009-AMC-1563 (T), Proj. DA-1CO24401A328,
AERDL T-1824-66 ,TT 66-61029
Unclassified report

Trans. of Keikinzoku (Japan) v14 n4 (66) 1964.

Descriptors: (*Aluminum, Anodic coatings), (*Anodic coatings, Aluminum), Oxidation, Oxides, Optical properties, Sulfates, Aluminum compounds, Oxides, Japan, Aluminum alloys, Titanium alloys, Refractive index, Films

OPTICAL ANALYSIS OF THE MECHANISM OF FORMATION OF ALPHA-ALUMINA FILM: Main constituents of the films produced in sodium and potassium bisulphate melts or their mixtures were confirmed to be alpha-Al2O3. The film formed in ammonium bisulphate melt contained an appreciable amount of gamma-alumina. The films formed in conc. H2SO4 or in conc. H2SO4+oleum, consist mainly of gamma-Al2O3, but by longer formation, it was partly converted to alpha-Al2O3. REFRACTIVE INDICES AND DOUBLE REFRACTION OF VARIOUS ANODIC OXIDE FILMS: Anodic oxide films such as oxalic, sulphuric acid films formed at normal anodizing conditions and at lower temperature (hard-coating), chromic, sulphamic, phosphoric, boric (plus sulphuric) acid films, Ematal and Kalcolor films and boric acid-formamide films developed by the authors, were observed under polarizing microscopy and the refractive indices were determined and the existence of doubly-refracting properties was checked. Refractive indices of these films are usually lower than pure crystalline or amorphous alumina (1.67 plus or minus). (Author)

AD-631 173 Fld. 11/6
CFSTI Prices: HC $1.00 MF $0.50
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C
SOME FINDINGS ON THE ELOXAL CAST ALLOYS AND ELOXAL CASTINGS,
by A. Buckeley. Apr 66, 17p. Contract DA-44-009-AMC-1563 (T), Proj. DA-1C024401A328,
AERDL T-1836-66 ,TT 66-61031
Unclassified report

Einige Untersuchungen an Eloxal-Gusslegierungen und Gussteilen, trans. of das Metall (West Germany) n3 p211-4 1961.

Descriptors: (*Aluminum alloys, Grain structures (Metallurgy)), (*Magnesium alloys, Grain structures (Metallurgy)), Casting, Casting alloys, Anodic coatings, Silicon alloys, Titanium alloys, Refining (Metallurgy), Copper alloys, Reflection, Crystal lattice defects, West Germany

Increasing the titanium content within the frame established by DIN 1725/2 for the alloys G-AlMg3 and 241 G-AlMg3 (Cu) within 0-0.20% range refines the grain and makes the grain size less susceptible to the overheating of the smelting product. The higher titanium content impairs the glaze of the Eloxal somewhat, as do the higher concentrations of magnesium and silicon. The detrimental action of the silicon is not due to its penetration into the anodically built oxide layer. In addition, this layer becomes interrupted at those spots in which the Mg2Si separations appear. The foundation is also pitted by these. A discussion of the imperfections of the Eloxal layers due to the silicon refining process, to the different crystal orientation and to heat curing follows. (Author)

AD-631 185 Fld. 11/6, 13/8
CFSTI Prices: HC $3.60 MF $0.50
TITANIUM METALS CORP OF AMERICA NEW YORK
DEVELOPMENT OF A STABLE-BETA TITANIUM ALLOY.
Quarterly rept. no. 13, 1 Jul-30 Sep 65,
by D. B. Hunter. 30 Sep 65, 36p. Contract DA-30-069-ORD-3743,
WAL TR-405/2-12
Unclassified report

See also AD-623 600.

Descriptors: (*Titanium alloys, *Dispersion hardening), Vanadium alloys, Iron alloys, Aluminum alloys, Molybdenum alloys, Chromium alloys, Aging (Materials), Oxidation, Tensile properties, Creep, Ductility, Sheets

Time and temperature parameters for the 50 and 100% recrystallization of Ti-8Mo-8V-2Fe-3Al sheet were determined for the mill annealed condition and after two degrees of cold reduction. Aging response of the mill annealed sheet and of hot rolled sheet given a 25% cold reduction was determined employing aging temperatures of 800 - 1200F, and times of 2 - 24 hours. From this study, 37 combinations of solution treatment and aging were selected for room temperature tensile testing. Out of these tests, one fully aged condition, and one stabilized condition, for both mill annealed and cold rolled material, were selected for further evaluation. These four conditions were then evaluated by -65 and 600F smooth tensile tests and by room temperature, -65 and 600F notched tensile tests. In addition, a comparison of the oxidation resistance of Ti-8Mo-8V -2Fe-3Al and the commercial alloy Ti-13V-11Cr-3Al showed that the latter alloy was more resistant to oxidation. The evaluation of the stabilized ageable beta alloys was concluded with 150 and 500 hour creep stability tests; only Ti-8Mo-8V-2Fe-3Al retained useful amounts of ductility after both exposure times. (Author)

AD-630 688 See Fld. 13/8

AD-630 926 See Fld. 20/11

AD-630 937 See Fld. 8/10

AD-631 067 See Fld. 7/2

AD-631 078 See Fld. 8/1

AD-631 099 See Fld. 7/2

AD-631 174 See Fld. 13/8

AD-631 183 See Fld. 14/2

11/7. MISCELLANEOUS MATERIALS

AD-630 936 See Fld. 13/10

11/8. OILS, LUBRICANTS, AND HYDRAULIC FLUIDS

AD-630 689 See Fld. 13/8

11/9. PLASTICS

AD-630 566 Fld. 11/9, 9/3, 13/10
CFSTI Prices: HC $1.60 MF $0.50
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD
EFFECT OF WATER ABSORPTION ON DIMENSIONAL STABILITY OF ELECTRIC MOTOR ENCAPSULATING MATERIALS.
Research and development Phase rept.,
by John F. Tobin. Mar 66, 15p. Rept. no. MEL-421/65,
Proj. S-F013 12 15,
Unclassified report

Descriptors: (*Epoxy plastics, Encapsulation), (*Encapsulation, Epoxy plastics), (*Electric motors, Encapsulation), Performance (Engineering), Water, Absorption (Physical), Winding, Deep submergence, Statistical analysis, Underwater equipment, Degradation, Stability

Experiments with epoxy materials to determine their dimensional change as caused by water absorption (when used as encapsulating materials for submersible electric motor windings) were conducted with sufficient sample population to allow statistical analysis. The studies showed that the water absorption rates of the three epoxies were identical and that deep submergence pressures did not accelerate the absorption rate or the dimensional growth of the epoxies. Dimensional changes due to water absorption were found to be very small in all cases. (Author)

AD-630 847 Fld. 11/9, 13/8
CFSTI Prices: HC $1.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
WELDING OF TEFLON AND OTHER ORGANIC MATERIALS,
by I. M. Barkalov, V. I. Goldanskii, B. G. Dzantievand , and E. V. Egorov. Jan 66, 12p. Rept. no. FSTC-HT-23-23-66,
Proj. 2301-6553,
TT 66-60952
Unclassified report

Trans. of mono. Vsesoyuznyi Soveshchaniya po Radiotsionnoi Khimmi. Trudy (USSR) 1962 p616-20.

Descriptors: (*Plastics, *Bonding), (*Halocarbon plastics, Bonding), Nuclear industrial applications, Thermal neutrons, Neutron beams, Boron compounds, Lithium compounds, Styrene plastics, Polyethylene plastics, Acrylic resins, Tensile properties, USSR

A method is described for localizing the effect of ionizing radiation when welding polymeric materials with thermal neutrons. The method is based on the treatment of the surfaces to be welded with compounds of boron and lithium.

AD-630 913 Fld. 11/9, 20/11, 20/6, 19/4
CFSTI Prices: HC $2.00 MF $0.50
CLOTHING AND ORGANIC MATERIALS DIV ARMY NATICK LABS MASS
STUDY OF DYNAMIC BIREFRINGENCE AND STRAIN PRODUCED IN TRANSPARENT POLYMERS BY MECHANICAL IMPACT.
Technical progress rept. Jan 64-Jun 65,
by Anthony F. Wilde, John J. Ricca, and Francis deS. Lynch. Feb 66, 29p. Rept. no. 66-6-CM
Proj. DA-1L0f3001A91A
Unclassified report

Descriptors: (*Armor, Plastics), (*Plastics, Impact tests), (*Photoelasticity, Polymers), Optical materials, Refraction, Stresses, Mechanical waves, Propagation, Test equipment, Strain (Mechanics)

To obtain basic information about the mechanical and optical response of polymers, the stress-wave propagation in transparent plastics is being studied by observation of the dynamic strain and birefringence produced by mechanical impact. In this initial study, the dynamic strain-fringe constant of CR-39 plastic was studied over a range of apparent strain rates between 2,300 and 30,600 percent strain per second by the simultaneous measurement of the strain and birefringence occurring during the nearly linear leading edge of the strain pulse. Over this dynamic range no distinct dependence on the strain rate could be discerned. However, comparison of the average dynamic strain-fringe constant with the corresponding static value indicated a slight rate dependence over this larger total range of apparent strain rates. (Author)

AD-630 987 Fld. 11/9, 11/4
CFSTI Prices: HC $5.00 MF $1.00
PLASTICS TECHNICAL EVALUATION CENTER PICATINNY ARSENAL DOVER NJ
WEATHERING OF GLASS REINFORCED PLASTICS.
Summary rept.,
by George R. Rugger, and Joan B. Titus. Jan 66, 171p. Rept. no. PLASTEC-24,
Unclassified report

Descriptors: (*Thermosetting plastics, Degradation), Acrylic resins, Glass textiles, Laminated plastics, Amino plastics, Epoxy plastics, Phenolic plastics, Polyester plastics, Silicone plastics, Mechanical properties, Electrical properties, Optical properties, Wear resistance

Weathering effects are reported for the following types of glass-reinforced plastics: polyesters, epoxies, phenolics, melamines, silicones, and acrylic laminates.

AD-631 001 Fld. 11/9, 11/5
CFSTI Prices: HC $2.00 MF $0.50
ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS FORT BELVOIR VA
PREDICTION OF MECHANICAL BEHAVIOR OF PLASTICS UNDERGOING DECOMPOSITION FROM THE COMBINED EFFECTS OF ENVIRONMENTAL EXPOSURE AND STRESS.
Final rept.,
by S. Goldfein. Feb 66, 37p. Rept. no. 1847,
Task DA-1C024401A32902,
Unclassified report

Descriptors: (*Plastics, Mechanical properties), (*Laminated plastics, Degradation), Polester plastics, Cellulosic plastics, Phenolic plastics, Heat-resistant plastics, Reinforcing materials, Glass textiles, Paper, Stresses, Heating, Corrosion, Environmental tests, Chemical reactions, Rupture

A study was made to determine if the behavior of plastics undergoing breakdown from the effects of stress, elevated temperatures, and chemical attack could be predicted by means of a mechanical-chemical equation of state. Five systems were studied, the first four of which were tested for retention of strength at room temperature after environmental exposure: (a) Glass-reinforced polyester laminate exposed to an alkaline medium at elevated temperatures; (b) cellulose laminate exposed to elevated temperatures, resulting in oxidative degradation; (c) paper-phenolic laminate exposed to elevated temperatures, resulting in further cross-linking followed by oxidative degradation; (d) heat-resistant glass fiber polyester resin laminate exposed to very high degradative temperatures; and (e) same material and treatment as (d) except that the specimens were under stress during the exposure (stress-rupture). It is concluded that the effects of the various environments on the mechanical properties of the plastics under study can be predicted accurately by use of a parameter of the equation of state representing a second-order chemical reaction. (Author)

AD-630 635 **See Fld. 13/13**

AD-630 891 **See Fld. 7/5**

AD-630 926 **See Fld. 20/11**

AD-631 078 **See Fld. 8/1**

11/10. RUBBERS

AD-630 907 Fld. 11/10
CFSTI Prices: HC $4.00 MF $0.75
RUBBER RESEARCH INST TNO DELFT (NETHERLANDS)
STRESS RELAXATION AND CURING OF FLUORINATED ELASTOMERS.
Final rept. 1 Dec 63-30 Nov 64,
by N. Luyendijk. Jan 66, 108p. Contract AF 61 (052)-763, Proj. AF-7342, Task 734202, AFML TR-65-230
Unclassified report

Descriptors: (*Silicone plastics, Mechanical properties), (*Elastomers, Mechanical properties), (*Fluorine compounds, Silicone plastics), Stresses, Elasticity, Failure (Mechanics), Molecular structure, Crosslinking (Chemistry), Vulcanizates, Aging (Materials), Peroxides, Gamma rays, Metalorganic compounds, Lead compounds, Netherlands

Stress relaxation of elastomeric materials is one of the principal causes of mechanical failure of elastomeric components in today's flight vehicle. This phenomenon of stress relaxation in current fluorosilicone elastomers was thoroughly investigated and the results reported. The most significant conclusion from this work is that after the measurement of an elastomeric compound of different crosslink densities that random chain scission of polymer chains is responsible for stress decay during relaxation. A rate of modulus decrease in intermittent measurements is only slightly lower than the continuous relaxation rate, it is concluded that only a small fraction of the broken bonds are reformed. The information presented provides some insight as to the points of weakness in an elastomers vulcanizate and at the same time indicates an area where research efforts should be directed if we are to find elastomers having high strength at elevated temperature. (Author)

AD-630 909 Fld. 11/10, 14/2
CFSTI Prices: HC $2.00 MF $0.50
CLOTHING AND ORGANIC MATERIALS DIV ARMY NATICK LABS MASS
MEASUREMENT OF RUBBER ELASTICITY AT LOW TEMPERATURES USING A TWIST RECOVERY APPARATUS.
Technical rept. Jul 64-Jun 65,
by Angus Wilson. Jan 66, 40p. Rept. no. 66-4-CM ,C/OM-14
Unclassified report

Descriptors: (*Rubber, Elasticity), (*Elastomers, Elasticity), (*Elasticity, Measurement), Low-temperature research, Test equipment, Synthetic rubber, Nitrile rubber, Styrene plastics, Butadienes, Polyethylene plastics, Butyl rubber, Chloroprenes, Sulfur compounds, Halocarbon plastics, Silicone plastics

The apparatus and methods described in the report provide a new means of observing and measuring the low -temperature behavior of rubber. Since, in actual use, rubber is very often deformed only slightly, the new method subjects the test specimen to a twist deformation of 360 degrees, resulting in an elongation of approximately 5 percent along its side. The apparatus permits twist recovery and percentage of set to be measured at specific constant temperatures and also to be correlated with rising temperatures. The results show that, with the exception of a series of ethylene/ propylene/diene (EPD) rubber compounds, both the elasticity and the flexibility of rubbers are regained within the same range of low temperatures. The stress-strain behavior of EPD rubbers, which differs from that of other types of rubber, is briefly discussed. These techniques can be used not only to examine the basic behavior of rubbery materials, but also in the routine inspection of rubber items and components. (Author)

AD-630 744 **See Fld. 11/1**

AD-631 078 **See Fld. 8/1**

11/11. SOLVENTS, CLEANERS AND ABRASIVES

AD-630 596 **See Fld. 20/12**

11/12. WOOD AND PAPER PRODUCTS

AD-631 078 **See Fld. 8/1**

Field 12-MATHEMATICAL SCIENCES

12/1. MATHEMATICS AND STATISTICS

AD-630 525 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
THE NUMBER OF INTEGRABLE-SQUARE SOLUTIONS OF ORDINARY DIFFERENTIAL EQUATIONS.
Technical summary rept.,
by J. B. McLeod. Oct 65, 13p. Rept. no. MRC-TSR-578,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Differential equations, *Integration), Operators (Mathematics), Complex variables

This report gives an example in which a formally selfadjoint ordinary differential operator, of even order and with complex coefficients,has its two deficiency indices different. (Author)

AD-630 526 Fld. 12/1
CFSTI Prices: HC $3.00 MF $0.75
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
THE PROBLEM OF SINGULAR PERTURBATIONS OF LINEAR ORDINARY DIFFERENTIAL EQUATIONS AT REGULAR SINGULAR POINTS.
Technical summary rept.,
by D. L. Russell, and Y. Sibuya. Sep 65, 71p.
Rept. no. MRC-TSR-580,
Contract DA-11-022-ORD-2059 ,NSF-GP-2280

Unclassified report

Descriptors: (*Perturbation theory, Differential equations), Matrix algebra, Asymptotic series, Complex variables

AD-630 527 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON BESSEL POLYNOMIALS.
Technical summary rept.,
by F. M. Ragab. Jan 66, 11p. Rept. no. MRC-TSR-584,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Polynomials, *Special functions (Mathematical)), Bessel functions

New representations of the Bessel polynomials are given. (Author)

AD-630 528 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
THE EXISTENCE OF A GLOBAL CLASSICAL SOLUTION OF THE INITIAL-BOUNDARY VALUE PROBLEM FOR A NON-LINEAR HYPERBOLIC EQUATION.
Technical summary rept.,
by Jerome Sather. Nov 65, 32p. Rept. no. MRC-TSR-585,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Boundary value problems, Partial differential equations), (*Partial differential equations, Boundary value problems), Nonlinear differential equations, Functional analysis

AD-630 531 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
AN APPLICATION OF REPRESENTATIONS FOR THE GENERALIZED INVERSE OF A MATRIX.
Technical summary rept,
by Randall E. Cline. Sep 65, 26p. Rept. no. MRC-TSR-592,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Matrix algebra, Combinatorial analysis), Theorems, Numerical analysis

Generalized inverse representations are developed for solutions of the matrix equations A X A = A and X AX = X. It is shown that both the Scroggs-Odell pseudoinverse of a matrix and the Drazin pseudoinverse of a matrix with index one follow as special cases. Representations for the Drazin pseudoinverse of a matrix with index greater than one are also developed. (Author)

AD-630 533 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
CONTINGENCY TABLES: A REVIEW.
Technical summary rept.,
by Marvin A. Kastenbaum. Sep 65, 42p. Rept. no. MRC-TSR-596,
Contract DA-11-022-ORD-2059,
Unclassified report

Presented at the Gordon Research Conference on Statistics in Chemistry and Chemical Engineering, New Hampton, New Hampshire, July 14, 1965.

Descriptors: (*Statistical data, *Tables), Bibliographies

This report is primarily a review of the elementary principles and recent literature on contingency tables.

AD-630 535 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
PROPERTIES OF DIFFERENTIAL FORMS IN N REAL VARIABLES.
Technical summary rept.,
by H. B. Mann, Josephine Mitchell, and Lowell Schoenfeld. Nov 65, 9p. Rept. no. MRC-TSR-598,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Potential theory, Real variables), (*Partial differential equations, Real variables), Operators (Mathematics)

A result of Mann for harmonic forms in 2 real variables is generalized to more variables and to homogeneous elliptic operators of the second order with constant coefficients.

AD-630 536 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
EIGENFUNCTION EXPANSIONS IN BANACH SPACES.
Technical summary rept.,
by R. E. L. Turner. Jan 66, 31p. Rept. no. MRC-TSR-600,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Functional analysis, *Perturbation theory), (*Series, Functional analysis), Operators (Mathematics)

It is shown that the property of being a basis in a reflexive Banach space for a set of vectors, in particular the eigenfunctions of an unbounded operator, is preserved under certain perturbations. As an application the author shows that a large class of 2nd order differential operators with operator valued coefficients have bases of eigenfunctions in L (p) (0, 1), 1 < p < infinity. (Author)

AD-630 537 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
CHEBYSHEV SOLUTION OF LARGE LINEAR SYSTEMS.
Technical summary rept.,
by J. B. Rosen. Feb 66, 29p. Rept. no. MRC-TSR-602,
Contract DA-11-022-ORD-2059 ,NGR-50-022-028

Unclassified report

Descriptors: (*Linear programming, Numerical analysis), (*Numerical analysis, Linear programming), Least squares method, Matrix algebra, Optimization

The general problem considered is that of solving a linear system of equations which is singular or almost singular. A method is described which obtains a 'solution' to the system which is stable with respect to small changes in the matrix elements. This method will solve an overdetermined system in m variables and n equations (m < n) even when the system rank is less than m, and should therefore be very useful in many statistical apllications. In this case the error of the system is minimized in the Chebyshev norm using a linear programming formulation and solution. A numerical example using the Hilbert matrix is described in detail. (Author)

AD-630 538 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
A GENERALIZED INVERSE-EPSILON ALGORITHM FOR CONSTRUCTING INTERSECTION PROJECTION MATRICES, WITH APPLICATIONS.
Technical summary rept.,
by L. Duane Pyle. Feb 66, 34p. Rept. no. MRC-TSR-604,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Algorithms, *Matrix algebra), Complex numbers, Iterative methods, Least squares method

Given k linear manifolds and corresponding perpendicular projection matrices, a closed formula is derived for the perpendicular projection matrix. The derivation uses results taken from the theory of generalized inverses together with an application of Wynn's Epsilon-Algorithm to a convergent sequence of matrices. A variant of this formula is then used in solving arbitrary complex linear systems by iteration and in computing generalized inverses; the latter application provides a solution to least squares linear regression problems. (Author)

AD-630 541 Fld. 12/1, 9/2
CFSTI Prices: HC $3.00 MF $0.75
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON THE COMPUTATION OF CERTAIN FUNCTIONS OF LARGE ARGUMENT AND PARAMETER.
Technical summary rept.,
by P. Wynn. Dec 65, 60p. Rept. no. MRC-TSR-608,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Asymptotic series, Functions), (*Functions, Asymptotic series), (*Programming (Computers), Numerical analysis), Programming languages

The derivation of an asymptotic series for a certain class of functions is described: the process is mechanized for use with a digital computer. (Author)

AD-630 545 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON STABILITY OF LINEAR SMOOTHING FORMULAS.
Technical summary rept.,
by T. N. E. Greville. Mar 66, 25p. Rept. no. MRC-TSR-611,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Numerical analysis, Special functions (Mathematical)), (*Least squares method, Stability), Series, Polynomials

A proof is given of Schoenberg's conjecture that 'least-square' smoothing is stable, and is extended to include the entire class of minimum R sub m smoothing formulas. Minimum R sub infinity formulas are defined and studied. (Author)

AD-630 546 Fld. 12/1
CFSTI Prices: HC $3.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON TURNING POINT PROBLEMS FOR SYSTEMS WITH ALMOST DIAGONAL COEFFICIENT MATRIX.
Technical summary rept.,
by Wolfgang Wasow. Feb 66, 52p. Rept. no. MRC-TSR-612,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Differential equations, *Asymptotic series), (*Matrix algebra, Differential equations), Complex variables

AD-630 547 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
THE CAUCHY PROBLEM FOR GENERAL SYSTEMS OF LINEAR PARTIAL DIFFERENTIAL EQUATIONS.
Technical summary rept.,
by S. A. Halpern. Feb 66, 22p. Rept. no. MRC-TSR-613,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Partial differential equations, Boundary value problems), Integral transforms, Functional analysis

The work is a review of the author's doctoral dissertation published in Uspekhi Mat. Nauk, 18, pp 239249. (Author)

AD-630 548 Fld. 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
NEUTRALIZED VALUES. 1. INTRODUCTION.
Technical summary rept.,
by J. G. van der Corput. Jan 66, 44p. Rept. no. MRC-TSR-614,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Integral transforms, *Operators (Mathematics)), Groups (Mathematics), Distribution theory

Starting from a given fundamental set by means of neutrices new mathematical objects 'Neutralized Values' are introduced. The relations between these objects form a new analysis (neutrix calculus), which comprises not only the classical analysis, but infinitely many other calculi, such as that of the generalized functions and the operational calculus. Each of these calculi has a certain structure by which the calculus is determined. In the special neutrix calculus only neutralized values are admitted which are equal to an element of the fundamental set. The general neutrix calculus yields results outside the fundamental analysis. The introduction treats the neutrices, the neutralized values, the structures, the operators and the pseudo operators. Hadamard neutrices and some Laplace transforms. The following reports under the overall title 'Neutralized Values' will treat applications of the theory developed in this introduction. (Author)

AD-630 584 Fld. 12/1
MINNESOTA UNIV MINNEAPOLIS
SINGULARITIES OF SOLUTIONS OF NONLINEAR EQUATIONS,
by James Serrin. 1965, 24p. Contract AF-AFOSR-372-63,
AFOSR 66-0247
Unclassified report

Rept. on Applications of Nonlinear Partial Differential Equations in Mathematical Physics.

Availability: Published in Proceedings of Symposia in Applied Mathematics v17 p68-88 1965. Copies to DDC users only.

Descriptors: (*Partial differential equations, Theory), Calculus of variations, Nonlinear differential equations

AD-630 585 Fld. 12/1
MARYLAND UNIV COLLEGE PARK DEPT OF MATHEMATICS
SOME INEQUALITIES FOR GENERALIZED AXIALLY SYMMETRIC POTENTIALS WITH ENTIRE AND MEROMORPHIC ASSOCIATES,
by R. P. Gilbert. 25 Nov 63, 10p. Contract AF-AFOSR-400-64,NSF-GP-3937 Proj. AF-9749, Task 974901,NOL-FR-30
AFOSR 65-2113
Unclassified report

Availability: Published in Duke Mathematical Journal v32 n2 p239-46 Jun 1965. Copies to DDC users only.

Descriptors: (*Inequalities, *Potential theory), Functions, Partial differential equations, Operators (Mathematics), Complex variables

AD-630 595 Fld. 12/1, 9/3
CFSTI Prices: HC $9.60 MF $0.75
ILLINOIS UNIV URBANA ELECTRICAL ENGINEERING RESEARCH LAB
RATIONAL APPROXIMATION OF ARBITRARY REAL FUNCTIONS WITH SPECIFIED WEIGHTS.
Technical note (Doctoral thesis),
by Tao-Nan Tang. 1 May 60, 99p. Rept. no. TN-14,
Contract AF 49 (638)-63, Proj. AF-47501,
AFOSR TN-60-613
Unclassified report

Descriptors: (*Approximation (Mathematics), *Functions), Polynomials, Functional analysis, Iterative methods, Electrical networks

The problem of obtaining the Tchebysheff approximation of a real continuous function in a closed interval by a polynomial or a rational function under a specified weighting function is treated. Solutions of such problems are obtained by numerical methods involving iterative procedures which may be carried out by modern computing machines. The effect of shifting a zero or several zeros of an error function on the weighted error function itself is obtained by multiplying the amount of shift by the sensitivity, defined as the partial derivative of the weighted error function with respect to the zero shifted. Various techniques are used to equalize (and hence minimize) the extrema of the weighted error. The knowledge of the zero shifting effect on the weighted error is used to determine the amount of shifts in different cases. The successive equalization of the weighted error function at the points of extrema gives an iterative procedure with assured convergence of the process. In the case of polynomial approximation, this method yields a set of linear simultaneous equations to be solved in each cycle. In the case of rational function approximation, it results in a set of non-linear simultaneous equations which can be solved by certain special techniques. Special cases such as the approximation with equal-ripple relative error and an approximating polynomial with specified cutoff slope are investigated.

AD-630 606 Fld. 12/1
CFSTI Prices: HC $1.60 MF $0.50
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF STATISTICS
ON THE RELATION BETWEEN A PARTICULAR STOCHASTIC PROCESS AND ITS TWO IMBEDDED MARKOV CHAINS.
Technical rept.,
by Joseph L. Gastwirth, and Stephen S. Wolff.
Feb 66, 12p. Rept. no. TR-48,
Contract Nonr-4010 (09), Proj. NR-042-232,
Unclassified report

Descriptors: (*Stochastic processes, *Probability), Time, Signals, Hazards, Distribution theory

AD-630 663 Fld. 12/1
PURDUE UNIV LAFAYETTE IND DEPT OF STATISTICS
ON SELECTING A SUBSET CONTAINING THE BEST OF SEVERAL DISCRETE DISTRIBUTIONS,
by Klaus Nagel. Mar 66, 16p. Rept. no. Mimeograph Series-66,
Contract AF 33 (657)-11737,
Unclassified report

MF not for sale; pages 11-13 will not reproduce on MF.

Descriptors: (*Decision theory, *Set theory), Statistical distributions, Statistical analysis

AD-630 669 Fld. 12/1, 4/2
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
APPROXIMATION OF TWO-DIMENSIONAL FIELDS BY CHEBYSHEV POLYNOMIALS.
Research translation,
by T. M. Krupitskaya, and K. E. Chernin. Jan 66, 23p. Rept. no. T-R-521,
Contract AF 19 (628)-3880,
TT 66-60903
Unclassified report

Approksimatsiya Dvumernykh Polei Polinomami Chebysheva, trans. of Arkticheskii i Antarkticheskii Nauchno-Issledovatelskii Institut. Trudy (USSR) v271 n1 p31-44 1964.

Descriptors: (*Approximation (Mathematics), *Meteorological data), Polynomials, Functions, Series, USSR

AD-630 745 Fld. 12/1, 20/4
CFSTI Prices: HC $2.60 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C APPLIED MATHEMATICS LAB
THE GRAM-CHARLIER APPROXIMATION OF THE NORMAL LAW AND THE STATISTICAL DESCRIPTION OF HOMOGENEOUS TURBULENT FLOW NEAR STATISTICAL EQUILIBRIUM.
Final rept.,
by Joseph Kampe de Feriet. Mar 66, 29p.
DTMB 2013
Unclassified report

Descriptors: (*Turbulence, *Statistical analysis), Probability, Distribution functions, Statistical mechanics, Stochastic processes

The probability density distribution is discussed for two correlated random variables based on an approximation to a normal (Gaussian) law using Hermite polynomials of two variables. (Author)

AD-630 746 Fld. 12/1
CFSTI Prices: HC $3.60 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
CONTRIBUTIONS TO THE THEORY OF THE METHOD OF STEEPEST DESCENT I.
Technical summary rept.,
by A. M. Ostrowski. Mar 66, 35p. Rept. no. MRC-TSR-615,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Saddle point method, Theory), Functions, Sequences

A study of the derived set of a sequence of points obtained by the method of steepest descent. (Author)

AD-630 747 Fld. 12/1
CFSTI Prices: HC $3.60 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON

CONVERGENCE OF THE NEWTON PROCESS TO MULTIPLE SOLUTIONS.
Technical summary rept.,
by L. B. Rall. Feb 66, 38p. Rept. no. MRC-TSR-617,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Iterative methods, Sequences), Operators (Mathematics), Functional analysis, Approximation (Mathematics)

The slow convergence of Newton's method to multiple solutions of scalar and finite systems of equations is characterized, and a corrected Newton procedure having quadratic convergence is developed. The results are extended to a class of nonlinear operator equations. (Author)

AD-630 749 Fld. 12/1
CFSTI Prices: HC $1.10 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
GENERAL EXISTENCE CRITERIA FOR THE INVERSE OF AN OPERATOR.
Technical summary rept.,
by A. M. Ostrowski. Jan 66, 7p. Rept. no. MRC-TSR-619,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Perturbation theory, *Operators (Mathematics)), Functional analysis

A new bound is given for the perturbation of a nonsingular operator conserving its nonsingularity. (Author)

AD-630 751 Fld. 12/1
CFSTI Prices: HC $3.60 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON EUCLIDEAN SETS HAVING ONLY TWO DISTANCES BETWEEN POINTS.
Technical summary rept.,
by S. J. Einhorn, and I. J. Schoenberg. Mar 66, 39p. Rept. no. MRC-TSR-621,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Set theory, *Combinatoral analysis), Geometry

A set of n points of the euclidean k-dimensional space is called 2-valued provided that the distances between its points assume at most two positive values. It is shown that if n > or = k + 2 and k is fixed, then only a finite number of such sets exist. All of these are determined for the plane (k = 2) and for space (k = 3). (Author)

AD-630 752 Fld. 12/1
CFSTI Prices: HC $1.10 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
NOTE ON THE GENERALIZED INVERSE OF A MATRIX PRODUCT.
Technical summary rept.,
by T. N. E. Greville. Jan 66, 9p. Rept. no. MRC-TSR-623,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Matrix algebra, Theory)

Let A (+) denote the Moore-Penrose generalized inverse and A (*) the conjugate transpose of a matrix A. Several necessary and sufficient conditions are obtained for (AB) (+) = B (+)A (+) (where A (+) is the Moore-Penrose inverse of A), and the structure of matrices A and B satisfying this equation is examined.

AD-630 753 Fld. 12/1
CFSTI Prices: HC $1.60 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON THE MODULI OF ZEROS OF DERIVATIVES OF POLYNOMIALS.
Technical summary rept.,
by A. M. Ostrowski. Mar 66, 18p. Rept. no. MRC-TSR-624,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Polynomials, Algebra), (*Number theory, Polynomials), Inequalities

Relations are established between the moduli of the zeros of a polynomial and those of its derivative. (Author)

AD-630 755 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
QUADRATURE METHODS OF ARBITRARY ORDER FOR SOLVING LINEAR ORDINARY DIFFERENTIAL EQUATIONS.
Technical summary rept.,
by J. T. Day. Jan 66, 21p. Rept. no. MRC-TSR-635,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Differential equations, Numerical methods + procedures), (*Numerical methods + procedures, Differential equations), Integration, Boundary value problems

The writer shows that given any positive integer n there is a one step method for numerical integration of the linear ordinary differential equation Y' = AY + B of order n + 1. Three numerical examples indicate that the method is quite successful for the cases n = 3 and n = 4. (Author)

AD-630 756 Fld. 12/1
CFSTI Prices: HC $3.00 MF $0.75
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
RECENT TRENDS IN MULTIVARIATE PREDICTION THEORY.
Technical summary rept.,
by P. Masani. Jan 66, 58p. Rept. no. MRC-TSR-637,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Least squares method, Stochastic processes), (*Stochastic processes, Least squares method), (*Multivariate analysis, Theory), Mathematical prediction, Reviews

The paper surveys the present state of the theory of linear, least squares prediction of -variate weakly stationary stochastic processes with discrete time. The emphasis is on logical order. Hence recent developments are described within the context of a general theory rather than chronologically. Methods for computing the predictor are briefly discussed, but purely statistical questions such as the estimation of covariances are omitted. (Author)

AD-630 809 Fld. 12/1, 14/4
CFSTI Prices: HC $16.60 MF $1.00
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
ESTIMATION OF THE SCALE PARAMETER OF THE WEIBULL PROBABILITY DENSITY FUNCTION BY USE OF ONE ORDER AND OF M ORDER STATISTICS.
Master's thesis,
by Lester John Clark,Jr.. Aug 64, 170p. Rept. no. GRE/MATH/64-3,
Unclassified report

Descriptors: (*Statistical distributions, *Analysis of variance), (*Distribution functions, Probability), Tables, Distribution theory, Reliability, Life expectancy

Two estimators of the scale parameter O of the Weibull probability density function are developed by use of one and of m order statistics. In the development it is assumed that the shape parameter K is known or can be determined by some method. The location, or threshold, parameter C is assumed to be zero. The background of the Weibull p.d.f. is presented briefly, and the development of the distribution of order statistics, the moments of order statistics, the distribution of Weibull order statistics, and the moments of the Weibull order statistics are shown in detail. The single-order-statistic estimator development is based on the expected value of the ith order statistic. To obtain a linear m-order-statistic estimator the method of Lagrangian multipliers is used to obtain multipliers k sub i that will give a minimum variance unbiased estimator. The constraint used in this method is that the sum of the k sub i must be equal to the number of values m used where m is the truncation point. For example, with n=15, m=7, the seven k sub i must sum to 7. The m multipliers are then applied to the one-order-statistic estimators to determine an estimator for the scale parameter based on m order statistics. (Author)

AD-630 810 Fld. 12/1, 14/4
CFSTI Prices: HC $20.30 MF $1.25
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
ESTIMATION OF THE SCALE PARAMETER OF THE GAMMA DISTRIBUTION BY USE OF L ORDER STATISTICS.
Master's thesis,
by Thomas D. Hill. Dec 65, 207p. Rept. no. GRE/MATH/65-5,
Unclassified report

Descriptors: (*Statistical distributions, *Analysis of variance), (*Distribution functions, Analysis of variance), Tables, Monte Carlo method, Reliability, Life expectancy

A technique is developed for estimating the scale parameter of a gamma distribution with known shape parameter using 'L' order statistics. A best linear unbiased estimate may be computed by applying tabulated multipliers to 'L' of the first 'M' ordered observations. The variance of an estimator using all 'M' of the observations and the efficiencies of the L-order-statistic -estimators are given. Tabled ranges include shape parameters of alpha = 1 (1)6 for sample sizes of N = 1 (1)15. A method of obtaining the multipliers when the shape parameter is not an integer is also shown. Estimation by the use of L-order-statistics is particularly useful, for highly efficient estimators relative to the M-order-statistic-estimators may be obtained with a significant reduction in computational effort. (Author)

AD-630 811 Fld. 12/1, 14/4
CFSTI Prices: HC $24.00 MF $1.25
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING
LINEAR ESTIMATION OF THE LOCATION AND SCALE PARAMETERS OF THE WEIBULL AND GAMMA PROBABILITY DISTRIBUTIONS BY THE USE OF ORDER STATISTICS.
Master's thesis,
by Thomas A. Musson. Dec 65, 244p. Rept. no. GRE/MATH/65-9,
Unclassified report

Descriptors: (*Statistical distributions, *Analysis of variance), (*Distribution functions, Least squares method), Tables, Sampling, Reliability, Life expectancy

The least squares method of linear estimation can be applied to order statistics of certain continuous distributions. With the shape parameter known, this method is applied to the estimation of the location and scale parameters of the Weibull and Gamma distributions. Coefficients of estimation using the first M-order statistics and the best two-

order statistics from a small sample, were calculated and tabled. For the Weibull distribution, the tabled coefficients are for the shape parameter equal to 0.5 (.25)2.0 (0.5)4.0 with a sample size of 2 (1)15 for the two-order-statistic estimators and a sample size of 2 (1)10 for the M-order -statistic estimators. For the Gamma distribution, the shape parameter equals 1 (1)6 and the sample size equals 2 (1)15 for both estimators. (Author)

AD-630 834 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
NAVAL RESEARCH LAB WASHINGTON DC
BRIEF TABLE OF RING FUNCTIONS (TOROIDAL HARMONICS).
Memo. rept.,
by Evan B. Wright, and Paul I. Peterson. 22 Mar 66, 15p. Rept. no. NRL-MR-1679,
Proj. RR-010-04-41-5950,
Unclassified report

Descriptors: (*Tables, *Functions), Harmonic analysis, Special functions (Mathematical), Partial differential equations

This brief table gives six-figure values of some of the ring functions (Legendre functions of integral order and half-integral degree) and their derivatives for some selected values of the argument. These functions are solutions of Laplace's equation in toroidal coordinates.

AD-630 837 Fld. 12/1
CFSTI Prices: HC $4.60 MF $0.50
PURDUE UNIV LAFAYETTE IND DEPT OF STATISTICS
SEMI-REGULAR FUNCTIONS IN MARKOV CHAINS,
by Paul T. Holmes. Feb 66, 48p. Rept. no. Mimeograph Ser-62,
Contract AF33 (657)-11737,
Unclassified report

Descriptors: (*Probability, *Statistical functions), Measure theory, Stochastic processes

AD-630 887 Fld. 12/1, 8/7
CFSTI Prices: HC $2.60 MF $0.50
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF STATISTICS
THE STATISTICS OF ORIENTATION DATA.
Technical rept.,
by Geoffrey S. Watson. Mar 66, 26p. Rept. no. TR-51,
Contract Nonr-4010 (09), Proj. NR-042-232,
Unclassified report

Descriptors: (*Geophysics, *Statistical analysis), Vector analysis, Analysis of variance, Statistical distributions

This paper provides the key references for, and a summary of, statistical methods for describing and analyzing orientation data. Most of the paper is concerned with the author's approximate analysis of variance procedures for unit vectors in two and three dimensions. They are based on probability density proportional to exp (kappa cos theta) where kappa is an accuracy parameter and theta is the angle between the true and observed directions. A brief account of the theory for exp (kappa cos sq theta) and its generalization is given; this may be useful for axial data. (Author)

AD-630 888 Fld. 12/1
CFSTI Prices: HC $3.60 MF $0.50
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF STATISTICS
ON ROBUST PROCEDURES.
Technical rept.,
by Joseph L. Gastwirth. Mar 66, 38p. Rept. no. TR-32,
Contract Nonr-4010 (09), Proj. NR-042-232,
Unclassified report

Descriptors: (*Statistical tests, *Distribution functions), Sampling

The author discusses some robust rank tests for the two sample shift problem and a robust simple estimator for the location parameter of symmetric unimodal distributions. For a set F of density functions a maximum rank test is one which maximizes the minimum limiting Pitman efficiency relative to the best possible test for each member of F. The main theorem gives conditions for a maximun rank test to exist. The relationship of the present paper to the work of Birnbaum and Laska, Hodges and Lehman, and P. Huber is discussed. (Author)

AD-630 896 Fld. 12/1
MINNESOTA UNIV MINNEAPOLIS
REMOVABLE SINGULARITIES OF SOLUTIONS OF ELLIPTIC EQUATIONS,
by James Serrin. 16 Mar 64, 12p. Contract AF-AFOSR-372-63,
AFOSR 66-0253
Unclassified report

Availability: Published in Archive for Rational Mechanics and Analysis v17 n1 p67-78 1964. Copies to DDC users only.

Descriptors: (*Partial differential equations, Boundary value problems), Measure theory, Set theory

AD-630 897 Fld. 12/1
RICE UNIV HOUSTON TEX DEPT OF MATHEMATICS
NUMERICAL ANALOGS TO THE SCHWARZ ALTERNATING PROCEDURE,
by Keith Miller. 21 Jul 64, 15p. Contract AF-AFOSR-62-233, Proj. 9749, Task 974902,
AFOSR 66-0048
Unclassified report

Availability: Published in Numerische Mathematik v7 p91-103 1965. Copies to DDC users only.

Descriptors: (*Numerical methods and procedures, *Boundary value problems), Potential theory, Difference equations

AD-630 898 Fld. 12/1
CALIFORNIA UNIV BERKELEY DEPT OF MATHEMATICS
AN APPROACH TO THE ENUMERATION PROBLEM FOR NON-STABLE VECTOR BUNDLES,
by Ioan James, and Emery Thomas. 1966, 23p.
Contract AF-AFOSR-336-63, Proj. AF-9749, Task 974902,
AFOSR 66-0008
Unclassified report

Prepared in cooperation with Oxford Univ. (England).

Availability: Published in Journal of Mathematics and Mechanics v14 n3 p485-506 May 1965. Copies to DDC users only.

Descriptors: (*Algebraic topology, *Combinatorial analysis), Mapping (Transformations), Complex variables

AD-630 944 Fld. 12/1
CFSTI Prices: HC $3.60 MF $0.50
RAND CORP SANTA MONICA CALIF
LIMIT THEOREMS FOR TRANSIENT MARKOV CHAINS,
by Sidney C. Port. Apr 66, 40p. Rept. no. RM-4965-PR,
Contract AF 49 (638)-1700,
Unclassified report

Descriptors: (*Theorems, *Probability), Boundary value problems, Asymptotic series, Numerical methods + procedures

AD-630 998 Fld. 12/1, 9/2
CFSTI Prices: HC $2.60 MF $0.50
STANFORD UNIV CALIF DEPT OF COMPUTER SCIENCE
EIGENVECTORS OF A REAL MATRIX BY INVERSE ITERATION,
Technical rept.,
by J. M. Varah. 8 Feb 66, 27p. Rept. no. CS-34,
Contract Nonr-225 (37), Proj. NR-044-211,
Unclassified report

Descriptors: (*Iterative methods, *Matrix algebra), Programming (Computers), Complex variables, Algorithms, Programming languages

This report contains the description and listing of an ALGOL 60 program which calculates the eigenvectors of an arbitrary real matrix, using the technique of inverse iteration. (Author)

AD-631 051 Fld. 12/1, 6/5
MICHIGAN STATE UNIV EAST LANSING
ON A PARTIAL DIFFERENTIAL EQUATION OF EPIDEMIC THEORY. I,
by J. Gani. 1965, 6p.
Unclassified report

Prepared in cooperation with Sheffield Univ. (England).

Availability: Published in Miscellanea p617-22. Copies to DDC users only.

Descriptors: (*Stochastic processes, *Partial differential equations), (*Epidemiology, Stochastic processes), Model theory, Integral transforms, Biometry

AD-631 074 Fld. 12/1
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
ON THE THEORY OF BOOLEAN FORMULAS: SHORTEST AND PRIME FORMULAS.
Physical and mathematical science research papers,
by E. W. Samson, and L. Calabi. Feb 66, 25p.
Rept. no. AFCRL-PMSRP-195,AFCRL-66-101
Proj. AF-4608, Task 460805,
Unclassified report

Prepared in cooperation with Parke Mathematical Labs., Inc., Carlisle, Mass.

Descriptors: (*Algebras, Theory), Set theory, Mathematical logic

The notion of prime implicant is defined and studied at a high level of generality. All the usual results are preserved and deepened and some new ones obtained. Paramount are those relating prime implicants and shortest sums. This theoretical development may be applied to the minimization of Boolean formulas built from formulas of an arbitrarily given set S (for example, the set of formulas realized by devices of a particular kind) and representing a given incomplete switching function. Several computational processes are briefly discussed. The general theory is supplemented by results particular to the 'classical' case in which S is the set of the products of literals. (Author)

AD-631 081 Fld. 12/1
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF MATHEMATICS
AN INDUCTIVE METHOD FOR CONSTRUCTING MINIMAL BALANCED COLLECTIONS OF FINITE SETS,
by Bezalel Peleg. 1965, 9p. Contract N62558-3586,
Unclassified report

Prepared in cooperation with Michigan Univ., Ann Arbor, Dept. of Mathematics.

Availability: Published in Naval Research Logistics Quarterly v12 n2 p155-62 Jun 1965. Copies to DDC users only.

Descriptors: (*Set theory, Combinatorial analysis), Game theory, Matrix algebra, Mathematical logic, Israel

AD-631 091 Fld. 12/1
TECHNION - ISRAEL INST OF TECH HAIFA
THE PRECESSING SYSTEM OF REFERENCE,
by Z. Karni. 1 May 65, 7p. Contract AF-EOAR-71-64,
AFOSR 66-0244

Unclassified report

Prepared for presentation at Israel Conf. (13th) on Theoretical and Applied Mechanics, Jun 65.

Availability: Published in Israel Journal of Technology v3 n2 p147-51, 1965. Copies to DDC users only.

Descriptors: (*Precession, Differential equations), (*Equations of motion, Integration), Motion, Vector analysis, Momentum, Israel

The use of a precessing system of reference in the solution of inhomogeneous differential vector equations of the first and second order is demonstrated. (Author)

AD-631 113 Fld. 12/1
MISSOURI UNIV COLUMBIA
THE SPECTRUM OF AN OPERATOR IN BANACH SPACE,
by M. D. George. 10 Aug 64, 7p. Contract AF-AFOSR-62-97,
AFOSR 66-0258

Unclassified report

Availability: Published in Proceedings of the American Mathematical Society v16 n5 p980-2 Oct 1965. Copies to DDC users only.

Descriptors: (*Functional analysis, *Operators (Mathematics)), Transformations (Mathematics)

AD-631 114 Fld. 12/1
YALE UNIV NEW HAVEN CONN DEPT OF MATHEMATICS
ON THE MAXIMALITY THEOREM OF WERMER,
by T. P. Srinivasan, and Ju-Kwei Wang. 3 Aug 63, 4p. Contract AF-AFOSR-407-63 Proj. AF-9749, Task 974902,
AFOSR 66-0015

Unclassified report

Availability: Published in American Mathematical Society Proceedings v14 n6 p997-8 Dec 1963. Copies to DDC users only.

Descriptors: (*Theorems, *Functional analysis), Algebra, Measure theory

The maximality theorem proven is as follows: Let C denote the sup-norm algebra of all continuous functions on the unit circle, and let A denote the subalgebra of those functions which have analytic extensions to the interior. Then A is a maximal closed subalgebra of C.

AD-631 124 Fld. 12/1
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
PROOF OF THE MANLEY-ROWE RELATIONS FROM QUANTUM CONSIDERATIONS,
by B. D. Anderson. 18 Aug 65, 2p. Contract AF-AFOSR-337-63,
AFOSR 66-0192

Unclassified report

Availability: Published in Electronics Letters Sept 1965. Copies to DDC users only.

Descriptors: (*Quantum mechanics, Equations)

The document is comprised of critical comments by Anderson of the paper 'Proof of the Manley-Rowe Relations from Quantum Considerations', by J. Brown, Electronics Letters v1 p23; and of Brown's reply.

AD-631 125 Fld. 12/1
CALIFORNIA UNIV BERKELEY
EXCEPTIONAL LIE GROUPS AND STEENROD SQUARES,
by Emery Thomas. 21 Dec 63, 8p. Contract AF-AFOSR-336-63,
AFOSR 66-0034

Unclassified report

Availability: Published in Michigan Mathematical Journal v11 p151-6 1964. Copies to DDC users only.

Descriptors: (*Groups (Mathematics), *Algebraic topology), Theory

AD-631 126 Fld. 12/1
CALIFORNIA UNIV BERKELEY DEPT OF MATHEMATICS
ON CROSS SECTIONS TO FIBER SPACES,
by Emery Thomas. 21 Apr 65, 4p. Contract AF-AFOSR-336-63,
AFOSR 66-0032

Unclassified report

Availability: Published in Proceedings of the National Academy of Sciences v54 n1 p40-1 Jul 1965. Copies to DDC users only.

Descriptors: (*Algebraic topology, Theory)

AD-631 127 Fld. 12/1
CALIFORNIA UNIV BERKELEY
STEENROD SQUARES AND H-SPACES: II.
Revised ed.,
by Emery Thomas. 13 Aug 64, 26p. Contract AF-AFOSR-336-63,
AFOSR 66-0035

Unclassified report

Revision of manuscript submitted 23 Mar 1964.

Availability: Published in Annals of Mathematics v81 n3 p473-95 May 1965. Copies to DDC users only.

Descriptors: (*Algebraic topology, Theory)

AD-631 132 Fld. 12/1
BROOKHAVEN NATIONAL LAB UPTON N Y
SOME PROBLEMS IN NUMERICAL ANALYTIC CONTINUATION,
by J. R. Cannon, and Keith Miller. 14 Sep 64, 14p. Contract AF-AFOSR-62-233, Proj. AF-9749, Task 974902,
AFOSR 66-0055

Unclassified report

Prepared in cooperation with Rice Univ., Houston, Tex.

Availability: Published in J. Siam Numer. Anal. (SB) v2 n1 p87-98 1965. Copies to DDC users only.

Descriptors: (*Numerical analysis, *Functions), Polynomials, Linear programming

AD-631 133 Fld. 12/1
BRAZIL UNIV RIO DE JANEIRO INSTITUTO DE MATEMATICA PURA E APLICADA
SOBRE O PROBLEMA FUNDAMENTAL DA TEORIA DAS EQUACOES DIFERENCIAIS (THE SOLUTION OF A FUNDAMENTAL PROBLEM IN THE THEORY OF DIFFERENTIAL EQUATIONS),
by Mauricio M. Peixoto. 1962, 6p. Contract AF-AFOSR-62-334, Proj. AF-9749, Task 974902, AFOSR 66-0031

Unclassified report

Text in Spanish.

Availability: Published in Summa Brasiliensis Mathematicae v5 p190-4 1962. Copies to DDC users only.

Descriptors: (*Differential equations, Theory), Topology, Stability, Brazil

This is a talk of a rather expository nature. The idea is to illustrate the importance of the concept of structural stability in the general theory of differential equations on a manifold. An explicit proof is given for the fact that in a compact manifold there are only denumerable many topologically distinct types of structurally stable systems.

AD-631 158 Fld. 12/1
CALIFORNIA UNIV BERKELEY
NONLINEAR EVALUTION EQUATIONS IN BANACH SPACES,
by Tosio Kato. 1965, 21p. Contract AF-AFOSR-553-64,
AFOSR 66-0255

Unclassified report

Availability: Published in Proceedings of Symposia in Applied Mathematics v17 p50-67 1965. Copies to DDC users only.

Descriptors: (*Functional analysis, *Nonlinear differential equations), Boundary value problems, Partial differential equations

AD-631 190 Fld. 12/1
CFSTI Prices: HC $4.60 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C APPLIED MATHEMATICS LAB
LECTURES ON TOPICS IN NONLINEAR DIFFERENTIAL EQUATIONS,
by G. Temple. Mar 60, 50p.
DTMB 1415

Unclassified report

Prepared in cooperation with Oxford Univ. (England).

Descriptors: (*Nonlinear differential equations, Theory), Integration, Perturbation theory

These lectures describe some recent researches by the author and one of his graduate students at Oxford University on ordinary nonlinear differential equations. The first lecture is devoted to a search for a 'superposition' principle for these nonlinear equations and it determines the class of nonlinear equations for which such a superposition principle exists. The remaining four lectures provide a rigorous, analytical theory of the technique invented by Lighthill (1949) for solving nonlinear differential equations with an 'irregular' perturbation. Such equations involve a small parameter alpha and such that the coefficient of the highest derivative vanishes identically, or at the 'initial point', when alpha = 0. The theory is developed from a number of simple examples and given a rigorous form by means of the theory of 'dominant functions'. (Author)

AD-630 529 See Fld. 20/4

AD-630 532 See Fld. 20/3

AD-630 534 See Fld. 20/4

AD-630 539 See Fld. 20/3

AD-630 540 See Fld. 20/10

AD-630 542 See Fld. 20/10

AD-630 612 See Fld. 20/14

AD-630 627 See Fld. 5/3

AD-630 632 See Fld. 20/9

AD-630 644 See Fld. 18/3

AD-630 708 See Fld. 6/3

AD-630 754 See Fld. 6/3

AD-631 070 See Fld. 20/4

AD-631 083 See Fld. 9/4

AD-631 167 See Fld. 20/1

12/2. OPERATIONS RESEARCH

AD-630 568 Fld. 12/2
CFSTI Prices: HC $10.60 MF $0.75
CALIFORNIA UNIV BERKELEY DEPT OF MATHEMATICS
CONTINUOUS OPTIMAL CONTROL PROBLEMS WITH PHASE SPACE CONSTRAINTS.
Technical rept.,
by Jane Cullum. Dec 65, 101p. Contract Nonr-222 (88)

Unclassified report

Descriptors: (*Optimization, *Control), Calculus of variations, Trajectories, Topology

The first part is devoted to proving that for a control problem satisfying the proper differentiability hypotheses and in which the optimization is made over a set of trajectories of the associated differential system that are in a fixed closed subset A of E (n), if an optimal solution exists such that the optimal trajectory is on the boundary of A and such that in a neighborhood of this trajectory, the boundary of A is the C (2)- diffeomorphic image of an open set in E (n-1), then this optimal solution satisfies a modified version of Pontryagin's maximum principle. The proof presented is direct and uses only the constructions used in the proof of Pontryagin's principle. If a C (2)- diffeomorphism exists, it is proved that the problems considered by Gamkrelidze are included in the problems considered in this paper. The restriction made by Gamkrelidze that the controls be piecewise smooth is removed, and the condition that the control sets be regular is relaxed. In the second part, three types of approximations of sequences of trajectories paired with their controls to a trajectory and its control are defined. The first type involves only the convergence of the trajectories, the second and third types add the convergence of the corresponding controls in the weak L (2)-topology and the strong L (2)-topology respectively. Next penalty functions are introduced and the problems generated perturbed; it is proved that the preceding results still hold for this new family of problems. Finally, results involving controllability hypotheses are obtained, and a specialized theorem involving approximations of type three is proved.

AD-630 619 Fld. 12/2
CFSTI Prices: HC $6.60 MF $0.75
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
GAMES OF SEQUENCE PREDICTION.
Research rept.,
by David William Matula. Feb 66, 65p. Rept. no. ORC-66-3,
Contract Nonr-222 (83),DA-31-124-ARO (D)-331 Proj. RR-003-07-01,
AROD 5307:8

Unclassified report

Descriptors: (*Game theory, *Optimization), Sequences, Mathematical prediction, Operations research

Contents: Introduction; Emission prediction games; Partial sum bounded sequences and distribution bounded densities; Value of emission prediction game with self disjoint list; Optimal emittor strategies; Emission prediction games with overlapping lists; and Extensions and implications of the theory.

AD-630 620 Fld. 12/2
CFSTI Prices: HC $1.60 MF $0.50
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
TWO-STAGE LINEAR PROGRAM UNDER UNCERTAINTY: A BASIC PROPERTY OF THE OPTIMAL SOLUTION.
Research rept.,
by Katta G. Murty. Feb 66, 16p. Rept. no. ORC-66-4,
Contract Nonr-222 (83),DA-31-124-ARO (D)-331 Proj. RR-003-07-01,

Unclassified report

See also AD-612 896, AD-621 569.

Descriptors: (*Optimization, *Linear programming), (*Uncertainty, Linear programming), Decision theory, Convex sets, Probability

The two-stage linear program under uncertainty proposed by George B. Dantzig and developed by A. Madansky, A. Williams, Roger Wets and R. Van Slyke is considered. Roger Wets has shown that the set of feasible solutions to a linear program under uncertainty is a convex polyhedron, and the objective function to be minimized is a convex function. In this paper the author shows that there exists an optimal solution to the linear program under uncertainty in which the column vectors corresponding to the positive first-stage decision variables are linearly independent. This leads to the result that there exists an optimal solution in which not more than m + m (bar) of the first-stage decision variables are positive. (Author)

AD-630 716 Fld. 12/2
NEW YORK UNIV N Y
INTERPOLATION OF THE RENEWAL FUNCTION,
by Sylvain Ehrenfeld. 17 Feb 65, 5p. Contract DA-ARO (D)-31-124-G371,
AROD 3133:4

Unclassified report

Availability: Published in Operations Research v14 n1 p79-83 Jan-Feb 1966. Copies to DDC users only.

Descriptors: (*Operations research, *Probability), Replacement theory, Reliability, Statistical processes, Integral transforms

Some useful conditions are explored for determining a renewal process from knowledge of the renewal function H (t) at values H (h), H (2h), ... for some h>0. Furthermore, these conditions are used for expressing H (t) as an infinite interpolation series involving H (h), H (2h),... The results are useful for estimation problems in replacement and reliability involving attribute observations of renewal processes. (Author)

AD-630 841 Fld. 12/2
CFSTI Prices: HC $1.60 MF $0.50
TEXAS A AND M UNIV COLLEGE STATION INST OF STATISTICS
INTEGRAL OPERATORS FOR PERT SUB NETWORKS.
Technical rept.,
by Larry J. Ringer. 23 Mar 66, 12p. Rept. no. TR-2,
Contract DA-31-124-ARO (D)-282,
AROD 4721:3

Unclassified report

See also AD-626 486.

Descriptors: (*Operations research, Management engineering), (*Operators (Mathematics), *Electrical networks), Electric bridges, Monte Carlo method, Integral transforms, Algorithms

AD-630 861 Fld. 12/2
CFSTI Prices: HC $1.60 MF $0.50
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
AN EXTENSION OF GENERALIZED UPPER BOUNDED TECHNIQUES I FOR STRUCTURED LINEAR PROGRAMS.
Technical rept.,
by M. Sakarovitch, and R. Saigal. Dec 65, 17p. Rept. no. ORC-65-33,
Contract DA-31-124-ARO (D)-331,PHS-GM-9606 Proj. DA-22014501B14C
AROD 5307:7

Unclassified report

Descriptors: (*Linear programming, *Algorithms), Combinatorial analysis, Optimization

An algorithm is developed for solving a special structured linear program. The particular structure studied has a large number of blocks coupled together by a relatively few connecting equations. The method proposed in an extension of 'Generalized Upper bounding Techniques for Linear Programming-I,' by G. B. Dantzig and R. M. Van Slyke (March 1965) and, from the basis, defines a working basis which is much smaller in size than the original. Two methods of updating the working basis are proposed. (Author)

AD-630 862 Fld. 12/2, 22/3
CFSTI Prices: HC $4.60 MF $0.50
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y RESEARCH DEPT
SOME REMARKS CONCERNING THE NEWTON-RAPHSON ALGORITHM AND ABNORMALITY IN ATMOSPHERIC ENTRY CONTROL PROBLEMS,
by M. Falco, and F. Sobierajski. Mar 66, 42p. Rept. no. RE-244,

Unclassified report

Descriptors: (*Iterative methods, Optimization), (*Atmosphere entry, *Control), Trajectories, Boundary value problems, Numerical analysis

A connection is made between the appearance of abnormal trajectories in optimal control problems and convergence difficulties of the Newton-Raphson iterative technique in producing numerical solutions to the nonlinear two-point boundary value problem in these cases. The connection is displayed in the context of a particular time-fixed optimal control problem involving an atmospheric entry vehicle for which numerical evidence has been obtained. (Author)

AD-630 885 Fld. 12/2
CFSTI Prices: HC $1.60 MF $0.50
RAND CORP SANTA MONICA CALIF
A NEW APPROACH TO THE DUALITY THEORY OF MATHEMATICAL PROGRAMMING,
by Stuart Dreyfus, and M. Freimer. 26 Jun 61, 14p. Rept. no. P-2334,

Unclassified report

Prepared in cooperation with Lincoln Lab., Mass. Inst. of Tech., Lexington.

Descriptors: (*Mathematical programming, Theory), Optimization, Inequalities

AD-630 942 Fld. 12/2
CFSTI Prices: HC $1.60 MF $0.50
CASE INST OF TECH CLEVELAND OHIO OPERATIONS RESEARCH GROUP
THE DECOMPOSITION PRINCIPLE IN ENGINEERING PROBLEMS: TOWARDS A MULTI-LEVEL CONCEPT OF PROBLEM-SOLVING. I.
Technical Memo.,
by Hamilton A. Chase, and S. S. Sengupta. 1961, 19p. Rept. no. TM-14,
Contract Nonr-1141 (11) ,Nonr-1141 (12)

Unclassified report

Descriptors: (*Problem solving, *Engineering), Nonlinear differential equations, Functional analysis, Algorithms

The principal result of this report is a demonstration that systems of ordinary differential equations of engineering that are too large for the available computers can be solved by a principle of 'decomposition.' It is shown that the systems of resulting subproblems are members of a larger class of problems. The properties of this class are investigated and conditions stated under which the solutions of the subproblems converge to those of the original problem. A measure of the interaction between the subproblems is suggested for a subsequent investigation. (Author)

AD-630 943 Fld. 12/2
CFSTI Prices: HC $2.60 MF $0.50
CASE INST OF TECH CLEVELAND OHIO OPERATIONS RESEARCH GROUP
THE DECOMPOSITION PRINCIPLE IN ENGINEERING PROBLEMS: TOWARDS A MULTILEVEL CONCEPT OF PROBLEM SOLVING.
Technical memo.,
by H. A. Chase, and S. S. Sengupta. 1962, 23p.
Rept. no. TM-16,
Contract Nonr-1141 (11) ,Nonr-1141 (12)
Unclassified report

Descriptors: (*Problem solving, *Engineering), Nonlinear differential equations, Algorithms, Graphics, Linear programming, Functional analysis

In a previous report (AD-630 942) it was shown that a large system of differential equations could be decomposed into smaller groups (called subproblems) such that the solutions of the subproblems converged to the solution of the original system. It was also shown that the decomposition was most effective when the original problem was decomposed along the boundaries of weakest interaction in terms of the Lipscitz constants. This last fact, however, is a desirable but not essential condition. The major purpose of the present report is to develop certain techniques which will facilitate the application of the decomposition principle as stated in the previous report. The techniques fall into two categories: (a) Those that help indicate how the grouping may be done in a natural and efficient manner, and (b) Those that lead to a prior simplification of the original problem before the variables are grouped. Techniques of the first category make use of what has been called 'directed graphs'; those of the second category concentrate on the various types of linearization. (Author)

AD-631 009 Fld. 12/2
CFSTI Prices: HC $2.60 MF $0.50
RAND CORP SANTA MONICA CALIF
MARKOV RENEWAL PROGRAMMING BY LINEAR FRACTIONAL PROGRAMMING,
by Bennett Fox. Apr 66, 28p. Rept. no. P-3257-1,
Unclassified report

Descriptors: (*Stochastic processes, *Linear programming), Optimization, Algorithms, Measure theory

Markov renewal programming is treated by linear fractional programming. Particular attention is given to the resolution of tied policies that minimize expected cost per unit time. The multichain case is handled by a decomposition approach. (Author)

AD-631 057 Fld. 12/2, 8/8
CFSTI Prices: HC $1.60 MF $0.50
MICHIGAN STATE UNIV EAST LANSING DEPT OF STATISTICS
FLOODING MODELS.
Technical rept.,
by J. Gani. 22 Dec 65, 20p. Rept. no. MSU-RM-149,JG-10
Contract Nonr-2587 (05) ,PHS-GM-13138-01
Unclassified report

Presented to the W.R.A. Reservoir Yield Symposium Oxford Univ. (England), 21-23 Sep 65. Prepared in cooperation with Sheffield Univ. (England), RR-4/JG-3.

Descriptors: (*Mathematical models, *Hydrology), Rivers, Dams, Floods, Stochastic processes

The purpose of the present paper is to propose mathematical models for a river system on which a sequence of dams is built whose principal function is the prevention of flooding (the model may also be of relevance in the control of river pollution). Instead of attempting to obtain explicit solutions to such models for some simple input distributions, the practical use of Markov chain methods in deriving probabilities of flooding when the inputs are assumed to be dependent random variables forming a non-homogeneous Markov chain will be demonstrated. (Author)

AD-631 075 Fld. 12/2, 14/1
INDIAN STATISTICAL INST CALCUTTA
THE MINIMAL COST FLOW PROBLEM WITH CONVEX COSTS,
by V. V. Menon. 1965, 11p.
Unclassified report

Availability: Published in Naval Research Logistics Quarterly v12 n2 p163-72 Jun 1965. Copies to DDC users only.

Descriptors: (*Cost effectiveness, *Transportation), (*Linear programming, Algorithms), Functions, India, Operations research

A new characterization of the solution to the transshipment problem where the cost of transporting along each route is a convex function of the amount shipped, is presented. The method of proof, that of using network theoretic methods, is elementary. Notion of duality, or the Kuhn-Tucker theorem, are not used, and a 'Primal' algorithm to solve the problem is outlined. (Author)

AD-631 077 Fld. 12/2
COWLES FOUNDATION FOR RESEARCH IN ECONOMICS YALE UNIV NEW HAVEN CONN
THE BOUNDED VARIABLE PROBLEM-AN APPLICATION OF THE DUAL METHOD FOR QUADRATIC PROGRAMMING,
by Andrew Whinston. 1965, 8p. Proj. NR-047 006,
Unclassified report

Availability: Published in Naval Research Logistics Quarterly v12 n2 p173-9 Jun 1965. Copies to DDC users only.

Descriptors: (*Algorithms, *Quadratic programming)

The paper presents an algorithm to solve the bounded variable quadratic programming problem. The algorithm is a direct extension of an earlier algorithm of H. Wagner (N.R.L.Q. 1958) for the case of a bounded variable linear programming problem. (Author)

AD-631 082 Fld. 12/2
LINCOLN LAB MASS INST OF TECH LEXINGTON
A CONSERVATION LAW FOR A WIDE CLASS OF QUEUEING DISCIPLINES,
by Leonard Kleinrock. 1965, 13p.
Unclassified report

Prepared in cooperation with California Univ., Los Angeles, Dept. of Engineering. Supported in part by U. S. Army, Navy, and Air Force.

Availability: Published in Naval Research Logistics Quarterly v12 n2 p181-92 Jun 1965. Copies to DDC users only.

Descriptors: (*Queueing theory, *Differential geometry), Statistical processes

A large class of queueing disciplines is defined for Poisson arrival statistics. For this class, a Conservation Law is proven which constrains the allowed variation in the average waiting times. Specifically, defining rho (p) as the product of the average arrival rate and the average service time for customers from the p-th priority group (where the priority system is any queue discipline included in the defined class) and W (p) as their average waiting time (in queue), the Conservation Law states that S rho (p) W (p) is invariant over the set of queue disciplines in the class. (Author)

AD-631 130 **See Fld. 5/3**

Field 13-MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

13/2. CIVIL ENGINEERING

AD-631 181 Fld. 13/2, 16/1, 4/2
CFSTI Prices: HC $2.60 MF $0.50
PACIFIC MISSILE RANGE POINT MUGU CALIF
THREE-DIMENSIONAL, ANALYTIC SOLUTIONS TO THE PROBLEMS OF DIFFUSION OF WIND-DRIVEN CONTAMINATION.
Technical memo.,
by H. F. Ludloff. 14 Apr 66, 26p. Rept. no. PMR-TM-66-4,
Unclassified report

Rept. on Study of Diffusion of Contamination from a Source of Finite Extent, cont. of PMR-TM-65-4.

Descriptors: (*Air pollution, Diffusion), (*Wind, Air pollution), (*Guided missile ranges, Air pollution), Dust, Aerosols, Waste gases, Equations, Contamination, Guided missile safety, Sources, Statistical distributions

Estimates of critical distances, up to which dust, aerosols, and (toxic) fumes may be driven, under the influence of various wind and diffusivity conditions, require that three-dimensional solutions to the problem of wind-driven contamination be derived, for application to range safety problems. The following work was directed to this end: (1) analytic solutions for constant wind and constant diffusivity were derived; (2) three -dimensional analytic solutions were derived, under the assumption that wind speed and eddy diffusivity vary, either in accordance with the conjugate power laws, or in a more general fashion; (3) a new method of solution is suggested which may be used for solving diffusion problems of a more general nature; (4) five particular, three-dimensional parabolic source solutions were derived.

13/3. CONSTRUCTION EQUIPMENT, MATERIALS AND SUPPLIES

AD-630 635 **See Fld. 13/13**

13/6. GROUND TRANSPORTATION EQUIPMENT

AD-630 856 Fld. 13/6
CFSTI Prices: HC $1.10 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
ELECTRIC BATTERY STACKER ESH-182,
by M. P. Golovkin. Mar 66, 9p. Rept. no. FSTC-HT-23-49-66,
Proj. 2301-6553,
TT 66-60961
Unclassified report

Trans. of Byulleten Tekhniko-Ekonomicheskoi Informatsii (USSR) n2 p55-6 1965.

Descriptors: (*Fork-lift vehicles, USSR), Handling, Performance (Engineering), Batteries + Components

A description of an electrically driven (battery or line current) stacker, with a load capacity of 1 ton, lifting height of 4.5 meters, and turning radius of 1.4 meters. (Author)

AD-630 804 **See Fld. 8/12**

AD-631 029 **See Fld. 8/13**

13/7. HYDRAULIC AND PNEUMATIC EQUIPMENT

AD-630 763 Fld. 13/7, 20/4
CFSTI Prices: HC $1.00 MF $0.50
HARRY DIAMOND LABS WASHINGTON D C
FLUID AMPLIFICATION SYMPOSIUM, OCTOBER 1965, VOLUME III, ADDENDUM I, EXPERIMENTAL STUDY OF A PROPORTIONAL FLUID AMPLIFIER.
Text of No. 1 Paper,
by Cyrille Pavlin. Oct 65, 7p.
Unclassified report

See also AD-601 501.

Descriptors: (*Fluid amplifiers, Symposia), (*Jets, Fluid amplifiers), Deflection, Pressure, Control systems, Design

An amplifier was designed and tested which applies the principle of the lever to aerodynamic jet deflection. The device yields good performances as a mass flow amplifier and provides facilities for matching impedances between stages. It can operate as a differential pressure sensor. (Author)

AD-630 790 Fld. 13/7
CFSTI Prices: HC $10.60 MF $0.75
MASSACHUSETTS INST OF TECH CAMBRIDGE ENGINEERING PROJECTS LAB
BASIC APPLIED RESEARCH IN FLUID POWER CONTROL.
Technical progress rept. no. 3, 1 Jun-15 Oct 65,
by S. Y. Lee, and H. H. Richardson. Jan 66, 110p. Rept. no. DSR-5393-3,
Contract AF-33 (615)-2210, Proj. AF-8226, Task 822604,
AFFDL TR-65-229
Unclassified report

See also AD-625 729.

Descriptors: (*Fluid amplifiers, *Control systems), (*Pneumatic systems, Fluid amplifiers), Pneumatic devices, Reliability, Pneumatic servomechanisms, Pulse modulation, Jets, Modulators, Transformers, Gas bearings, Diffusers, Transducers, Accelerometers, Flight control systems

The report presents technical results and describes progress in several phases of continuing applied research and development related to the design and development of high-performance fluid control devices for advanced aerospace systems. Emphasis continues to be placed on pneumatic components and systems which are capable of performing, with high reliability, over wide ranges of temperature and in the presence of intense radiation. The report describes current work dealing with a differential pulse-length modulated gas servo, the dynamic modeling of fluid jet modulators, electrostatic fluid jet modulation, gas actuated accelerometers, fluid transformers, gas bearings, and the interaction of a fluid jet and a receiver diffuser. (Author)

13/8. INDUSTRIAL PROCESSES

AD-630 609 Fld. 13/8, 7/4
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
EXPERIMENTAL STUDY OF ZONE REFINING OF THE BINARY SYSTEM TRIPHENYL ANTIMONY - NAPHTHALENE.
Physical sciences research papers,
by Marvin S. Brooks. Jan 66, 77p. Rept. no. AFCRL-PSRP-190,AFCRL-66-63
Proj. AF-5620, Task 562001,
Unclassified report

Prepared in cooperation with Philco Corp., Lexington, Mass.

Descriptors: (*Zone melting, Tracer studies), (*Metalorganic compounds, Zone melting), (*Antimony compounds, Zone melting), (*Naphthalenes, Zone melting), Non-destructive testing, Radioactive isotopes, Dynamics, Eutectics, Phase studies

An experimental study on the zone refining of the binary system triphenyl antimony - naphthalene was described. The isotope Sb124, which is a strong gamma emitter, was employed as a tracer; this allowed a rapid in situ nondestructive analysis, closely spaced experimental points, and the opportunity to study distribution as a function of varying experimental conditions. With the aid of computers apparent k's were calculated and the experimental data compared with those predicted from various mathematical models. (Author)

AD-630 652 Fld. 13/8, 14/2
CFSTI Prices: HC $4.00 MF $1.00
ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS MATERIALS TECHNOLOGY DIV
A REPORT GUIDE TO ULTRASONIC TESTING LITERATURE. VOLUME I.
Monograph series,
by Charles P. Merhib, and Ernest H. Rodgers.
Mar 66, 137p.
AMRA MS-66-02
Unclassified report

Descriptors: (*Non-destructive testing, Ultrasonic radiation), (*Ultrasonic radiation, Non-destructive testing), Abstracts, Bibliographies, Test methods

The main objective of this compilation is to provide a simple and fast access to information on the subject of ultrasonic testing and also to provide sufficient information in the form of abstracts and word descriptors to make the listing useful. This guide is Volume I of a series of planned report guides consisting of the complete coverage of items in the AMRA Nondestructive Testing Information Analysis Center covering the subject of ultrasonic testing exclusive of those items in the Center utilizing methods of ultrasonic attenuation.

AD-630 688 Fld. 13/8, 11/6
CFSTI Prices: HC $1.00 MF $0.50
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C
HARD ANODIZING OF BAKED ALUMINUM POWDER,
by E. M. Zarezki, and T. G. Pavlovskaya. 1966, 9p. Contract DA-44-009-AMC-1563 (T), Proj. DA-1C024401A328,
AERDL T-1823-66 ,TT 66-60912
Unclassified report

Tverdoe Anodirovanie Spechenogo Aluminievogo Poroshka, trans. of Vestnik Mashinostroeniya (USSR) n11 1963.

Descriptors: (*Aluminum, Powder metals), (*Powder metals, Electroplating), (*Anodic coatings, Aluminum alloys), USSR, Hardness

AD-630 689 Fld. 13/8, 11/8
CFSTI Prices: HC $2.00 MF $0.50
MATERIALS ADVISORY BOARD NAS-NRC WASHINGTON D C
FINAL REPORT OF THE PANEL ON LUBRICATION TO THE AD HOC COMMITTEE ON METALWORKING PROCESSES AND EQUIPMENT.
Sep 65, 40p. Rept. no. MAB-220-M,
Contract SD-118,
Unclassified report

Descriptors: (*Lubrication, Mechanical working), (*Mechanical working, Friction), Deformation, Metals, Reviews, Processing, Wear resistance

A survey was made of the state of knowledge of friction and lubrication as they relate to deformation processes and equipment. The report summarizes the findings and presents five recommendations. (Author)

AD-630 700 Fld. 13/8, 20/12
CFSTI Prices: HC $3.00 MF $0.75
SPERRY ELECTRONIC TUBE DIV SPERRY RAND CORP GAINESVILLE FLA
INVESTIGATION OF BRAZING TECHNIQUES FOR FERRIMAGNETIC MATERIALS.
Final rept. 15 Jun-15 Dec 65,
by Robert W. Buck, John M. White, and Louis A. Tentarelli. Jan 66, 77p. Rept. no. SETD-NJ-2769-0202-5,
Contract DA-28-043-AMC-00373 (E), Proj. 7900-21-223-15-00,
Unclassified report

Descriptors: (*Vapor plating, Solid state physics), (*Brazing, *Solid state physics), Evaporation, Sputtering, Iron, Nickel, Ferrites, Yttrium, Garnet, Magnetism, Dielectric properties, Electrodeposition

The following two vapor deposition metalizing techniques were developed for metalizing ferrimagnetic materials: (1) Evaporating approximately 6000 Angstrom units of iron, (2) Sputtering approximately 5000 Angstrom units of nickel. It was advantageous to electrodeposit about 0.0001 inch nickel on the vapor deposited films. Nickel ferrite and yttrium iron garnet toroids were fabricated and brazed to Kovar, copper and titanium mating members using a vacuum brazing furnace equipped with an induction coil. The parts to be brazed were placed inside a box-like nickel container which, in turn, was placed in the induction coil. Incusil 15 and copper-silver eutectic braze alloys were used. Relatively strain-free brazes were made between ferrimagnetic materials and both copper and titanium. Strain could not be eliminated when brazing to Kovar. No significant changes in either saturation magnetism or linewidth as a result of the brazing operation were observed. An increase in dielectric loss tangent was observed when nickel ferrite was metalized with evaporated iron. No changes in dielectric loss tangent were observed when sputtered nickel films were used as metalizing. (Author)

AD-630 705 Fld. 13/8, 20/2, 11/3
CFSTI Prices: HC $2.60 MF $0.50
CASE INST OF TECH CLEVELAND OHIO
DEPOSITION OF CARBON ON DIAMOND SEED CRYSTALS.
Final rept. 1 Jan-31 Dec 65,
by John C. Angus. 31 Jan 66, 24p. Contract AF 19 (628)-4785, Proj. AF-5621, Task 562103, AFCRL 66-107
Unclassified report

See also AD-619 292.

Descriptors: (*Vapor plating, Carbon), (*Diamonds, Vapor plating), Hydrocarbons, Crystals, Gas flow, Low-pressure research, Methane, Hydrogen, High-temperature research

Initial experiments were performed to confirm and extend the previously reported low pressure

growth of diamond seed crystals. Growth is accomplished by deposition of carbon from hydrocarbon gases at temperatures and pressures near 1000C and 1 mm of mercury respectively. Increases in weight of the diamond seed crystals have been observed, but the structure of the deposit has not been conclusively identified as diamond. (Author)

AD-630 743 Fld. 13/8, 11/3
DEPARTMENT OF THE NAVY WASHINGTON D C
APPLICATION OF PLASTIC COATINGS TO LARGE ARTICLES (NANESENIIE PLASTMASSOVYKH POKRITI NA KRUPNOGABARITNYE IZDELIYA),
by I. Ya. Al'shits, and A. M. Koryavin. 1965, 8p.

Unclassified report

Poor copy will not permit reproduction; CFSTI will not sell. Vestnik Mashinostroieniya, Machinebuilding Herald, n1 p48-51 no date.

Descriptors: (*Plastic coatings, Protective treatments), Flame spraying, Powders, Metals, Polymers, Heating, USSR

Thin-layer plastic coatings applied to various parts and articles have excellent anti-corrosion and, in the case of some plastics, high anti-friction properties. There are many different ways of applying thin plastic coatings, for example: gas-flame, jet spray, vibrational, centrifugal, vortex and others. Of these, the method most widely used both at home and abroad is that of applying finely-dispersed powdered plastic to the surface of the part or article. In this method, the metallic article is heated to a temperature somewhat higher than the melting temperature of the powered polymer and charged into a tank containing a suspension of the powder. On coming in contact with the heated surface of the article the polymer melts and, with additional heating, flows over the surface, forming a continuous uniform coating.

AD-630 859 Fld. 13/8
CFSTI Prices: HC $6.60 MF $0.75
BRUSH BERYLLIUM CO CLEVELAND OHIO
FABRICATION OF BERYLLIUM FINE WIRE.
Final technical rept.,
by A. G. Gross,Jr., R. G. O'Rourke, and W. W. Beaver. Apr 61, 63p. Rept. no. TR-200-228, Contract NOas-60-6108c,

Unclassified report

Descriptors: (*Beryllium, Wire), (*Wire, Drawing (Machine processing)), Mechanical properties, Twinning (Crystallography), X-ray diffraction analysis, Lubrication, Sulfur compounds, Graphite, Optimization, Pickling, Tests

The object of the project was to develop techniques for the fabrication of beryllium (S-200B) fine wire and establish optimum mechanical properties. Various lubricants and drawing temperatures were evaluated. Certain metal-sulfur compounds in conjunction with graphite were found to be the best solid-film combinations. Wire diameters as small as 0.00477 inch were produced with each lubrication system. A pickling technique was found which enhanced the bending properties of beryllium wire. The bend testing showed beryllium wire of commercial chemical purity to be ductile so long as the applied stress was rotationally-asymmetrical about the wire axis. Tensile testing revealed that strength levels in the vicinity of 200,000 psi were attainable and that tensile strength was a function of reduction ratio from the last anneal and of a drawn diameter but was not a function of pickled diameter. (Author)

AD-631 174 Fld. 13/8, 11/6, 11/3
CFSTI Prices: HC $1.00 MF $0.50
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C
ORIGINAL FOUNDRY ALUMINUM 'AL 99.9H' AS NEWER GLAZING MATERIAL,
by H. Ginsberg, R. Lattey, and H. Neunzig. Apr 66, 12p. Contract DA-44-009-AMC-1563 (T), Proj. DA-1C024-401A328,
AERDL T-1837-66 ,TT 66-61032

Unclassified report

Original-Hutten-Aluminium 'Al 99.9H' als Neuer Glanzwerkstoff, trans. of das Metall (West Germany) n3 p183-6 1960.

Descriptors: (*Aluminum, Anodic coatings), (*Aluminum alloys, Coatings), Magnesium alloys, Silicon alloys, Iron alloys, West Germany

Methods are described whereby aluminum and its alloys are given a glaze by the Eloxal or Alumilite anodic protection treatments. The treatments impart smoothness and glaze and a hard, thick and transparent oxide layer. Glazing processes currently in use are: the Erft process, based on a nitric acid-ammonium hydrogen fluoride solution; the Allupol II (R5 bright dip) process, based on phosphoric and nitric acids; the Aluflex process, based on sulfuric and chromic acids; and the Brytal process, based on a trisodium and soda solution. Relationships were determined between glaze and glazing process in Eloxal-treated original-foundry quality alloy Erftal and the alloys with magnesium, the Raffinals.

AD-630 565 **See Fld. 9/1**

AD-630 664 **See Fld. 1/4**

AD-630 694 **See Fld. 9/1**

AD-630 710 **See Fld. 9/1**

AD-630 784 **See Fld. 9/1**

AD-630 800 **See Fld. 9/1**

AD-630 814 **See Fld. 11/6**

AD-630 847 **See Fld. 11/9**

AD-630 894 **See Fld. 9/5**

AD-630 935 **See Fld. 9/1**

AD-630 948 **See Fld. 9/1**

AD-631 021 **See Fld. 9/1**

AD-631 034 **See Fld. 9/1**

AD-631 050 **See Fld. 14/2**

AD-631 064 **See Fld. 9/1**

AD-631 090 **See Fld. 14/1**

AD-631 122 **See Fld. 9/1**

AD-631 183 **See Fld. 14/2**

AD-631 185 **See Fld. 11/6**

13/9. MACHINERY AND TOOLS

AD-630 740 Fld. 13/9, 20/11
DEPARTMENT OF THE NAVY WASHINGTON D C
EXPERIMENTAL DETERMINATION OF STRESSES IN FREE WHEELING ROLLER MECHANISMS,
by V. F. Maltsev. 1961, 13p. Rept. no. Trans-901,

Unclassified report

Poor copy will not permit reproduction: CFSTI will not sell. Herald of Mechanical Engineering (USSR) p39-43 1961.

Descriptors: (*Roller bearings, Stresses), Performance (Engineering), Design, Friction, Wear resistance, USSR, Loading (Mechanics), Load distribution

AD-630 925 **See Fld. 1/3**

13/10. MARINE ENGINEERING

AD-630 683 Fld. 13/10, 9/2
CFSTI Prices: HC $4.60 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C HYDROMECHANICS LAB
MANUAL FOR PREPARING AND INTERPRETING DATA OF PROPELLER PROBLEMS WHICH ARE PROGRAMMED FOR THE HIGH-SPEED COMPUTERS AT THE DAVID TAYLOR MODEL BASIN,
by Richard Hecker. Aug 59, 46p.
DTMB 1244

Unclassified report

Descriptors: (*Propellers (Marine), Design), (*Programming (Computers), Handbooks), Data, Computers, Airfoils, Stresses

Brief descriptions are given of four propeller problems which are programmed on the high-speed computers. These problems are: (1) propeller design calculations using induction factors, (2) counterrotating propeller design calculations, (3) propeller blade stresses using simple beam theory, and (4) two-dimensional airfoil pressure distribution. The procedure for the preparation of data forms is explained and samples of data sheets as well as machine output sheets are included for each problem. (Author)

AD-630 692 Fld. 13/10
CFSTI Prices: HC $2.60 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C
FOULING OF SHIPS' BOTTOMS; EFFECT OF PHYSICAL CHARACTER OF SURFACE,
by A. S. Pitre, and J. G. Thews. Apr 35, 21p.
Rept. no. 398,

Unclassified report

Descriptors: (*Ship hulls, Surface properties), (*Fouling, Ship hulls), Marine biology, Surfaces, Stereoscopic photography, Growth

The broad objectives of the investigation were (a) To determine the relative degrees of fouling as influenced by the character of the surface of the ship. (b) To investigate the possibilities of stereoscopic photographic observations. (c) To define the degree of fouling by (1) The rate of growth. (2) The volume of growth per unit area.

AD-630 739 Fld. 13/10
DEPARTMENT OF THE NAVY WASHINGTON D C
IN DEFENSE OF CERTAIN CONDITIONS IN THE DESIGNING OF FISHING TRAWLERS,
by E. P. Muragin. 1960, 10p. Rept. no. trans-852,

Unclassified report

Poor copy will not permit reproduction: CFSTI will not sell. Rybnoye Khozyaystvo v11 p27-33 Moscow 1960.

Descriptors: (*Ships (Nonmilitary), Design), Ship structural components, Physical properties, USSR

AD-630 782 Fld. 13/10
CFSTI Prices: HC $4.00 MF $1.00
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
OPERATION OF SHIPBOARD WASHDOWN IN FREEZING WEATHER,
by Walter W. Perkins, and Robert M. Railey. 31 Dec 65, 104p. Rept. no. USNRDL-TR-972, Proj. SF-011-05-12, Task 11402,

Unclassified report

Descriptors: (*Des oyers, Cleaning), (*Cleaning, Cold weather tests), (*Freezing, Sea water), Feasibility studies, Ships, Ship hulls, Temperature, PHhysical properties, Ice, Wind, Ship decks, Operation

Operation of the washdown system aboard a destroyer (USS POWER, DD 839) was shown to be feasible in freezing weather. The measurements made in this determination included records of the ship's interior and exterior surface temperatures, air temperatures, wind velocity, distribution and flow rates of washdown water and selected physical properties of seawater. These parameters determine to a great extent the location, amount and rate of build-up of any seawater ice that may be formed by the operation of the washdown system. The methods employed for ice removal were also noted. The operating range of ships, within which it is possible to use the washdown, was shown to extend to the boundary of the iceberg area which corresponds to air temperatures of 10F. (Author)

AD-630 815 Fld. 13/10
CFSTI Prices: HC $1.00 MF $0.50
BUREAU OF SHIPS WASHINGTON D C
CONCEPT FORMULATION AND SHIP DESIGN-THE NEW WAY,
by A. W. Schmidt, G. D. Kerr, and A. F. Johnson. 25 Mar 66, 22p.
Unclassified report

Presented at Association of Senior Engineers Annual Technical Symposium (3rd).

Descriptors: (*Ships, Design), (*Systems engineering, Ships), Reasoning, Management planning

The application of 'Concept Formulation' to the Navy Shipbuilding Program is examined as of a year after its inception. The opportunities and problems thus far identified are discussed. The future of a program, designed to be responsive to the aims of DOD Directive 3200.9 of 1 July 1965, is projected in terms of what needs to be done and how it might be approached. Exposure, such as this paper provide, is intended to solicit application of promising analytic tools and a cooperative atmosphere for potential participants. (Author)

AD-630 816 Fld. 13/10
CFSTI Prices: HC $3.00 MF $0.50
BUREAU OF SHIPS WASHINGTON D C
A DESIGN PROCEDURE FOR DETERMINING THE CONTRIBUTION OF DECKHOUSES TO THE LONGITUDINAL STRENGTH OF SHIPS,
by Joseph T. Kammerer. 25 Mar 66, 55p.
Unclassified report

Presented at Association of Senior Engineers Annual Technical Symposium (3rd).

Descriptors: (*Ship structural components, Stresses), Ship hulls, Tensile properties, Moment of inertia, Design, Ship decks

A design procedure for determining the stresses in deckhouses is presented. The method includes a tabular procedure for calculating an effective moment of inertia which reflects the effectiveness of the deckhouse in contributing to longitudinal strength. The theoretical approach utilizes semi-empirical results of full scale experiments to evaluate the effect of differential deflections between deckhouses and their parent hull girders. This data was incorporated into an analytical treatment of the problem based on the plane stress theory. It is shown that all deckhouses contribute somewhat to the strength of ships and that this fact is useful to the naval architect in his quest for a structurally efficient ship. (Author)

AD-630 817 Fld. 13/10
CFSTI Prices: HC $2.00 MF $0.50
BUREAU OF SHIPS WASHINGTON D C
THE HULL PROPELLER RELATIONSHIP OF THE OCEANOGRAPHIC RESEARCH SHIP T-AGOR,
by Theodore H. Sarchin. 1965, 31p.
Unclassified report

Presented at Association of Senior Engineers Annual Technical Symposium (3rd).

Descriptors: (*Oceanographic vessels, Ship hulls), (*Ship hulls, Design), (*Propellers (Marine), Design), (*Cycloidal propellers, Design), Operation

The paper discusses the problems and solutions encountered in the design of the T-AGOR hull form. Five hull form variations were studied and model tested. The significance of hull shape, propeller location and transom immersion are discussed. Differences in the flow environment of cycloidal propellers are discussed and some criteria for the design of the hull for cycloidal propellers are brough out. A tabulation of data on the model tests is presented. (Author)

AD-630 818 Fld. 13/10
CFSTI Prices: HC $2.00 MF $0.50
BUREAU OF SHIPS WASHINGTON D C
ON THE FORCES AND HINGE MOMENT OF A STRUT-WING-POD HYDROFOIL ASSEMBLY UNDERGOING RETRACTION IN A BEAM SEA,
by Samuel M. Y. Lum. 1965, 45p.
Unclassified report

Presented at Association of Senior Engineers Annual Technical Symposium (3rd).

Descriptors: (*Hydrofoils, Performance (Engineering)), Force (Mechanics), Moments, Motion, Configuration, Roll, Sea water, Numerical analysis

To examine the structural adequacy and retraction capability of a hydrofoil assembly designed for inboard rotation, it is necessary to determine the external loading first. A simplified theory based on linearized rigid-body dynamics was developed to estimate the forces and hinge moment on a single (port or starboard) strut-foil-pod configuration undergoing retraction while the hull-borne boat is rolling in a beam sea. Utilizing available free-oscillation model test data of a representative hydrofoil craft, engineering 'upper bound' estimates are carried out to demonstrate the theory for the extreme 'foils up' and 'foils down' conditions. (Author)

AD-630 821 Fld. 13/10, 5/1, 14/4
CFSTI Prices: HC $2.00 MF $0.50
BUREAU OF SHIPS WASHINGTON D C
RELIABILITY PROGRAM PLAN FOR A DEVELOPMENT SHIPBOARD SYSTEM,
by Murray Burger, and S. Bruce Ensley. 1965, 41p.
Unclassified report

Presented at Association of Senior Engineers Annual Technical Symposium (3rd).

Descriptors: (*Reliability, *Management planning), (*Shipyards, Management planning), Design, Systems engineering, Maintainability, Shipborne, Marine engineering, Management engineering

Difficulties were recently experienced by the assigned project engineer and Navy project activity in establishing a reliability program plan for a development system. Much research and time were involved in analyzing Bureau directives and shipyard organization to satisfy reliability requirements. The results of this effort are outlined. Technical Development Plan requirements are identified. A total reliability program plan is defined. The sample development system and its reliability goals are described. The proposed shipyard reliability program covering organization, schedule and tasks assignments is outlined. Design review functions and design controls are reviewed to show how design assurance will be monitored. The plan requirements for design checkpoints, system review, data collection and reporting are described. The summary includes a brief analysis of the shipyard plan from the project engineer's viewpoint. (Author)

AD-630 822 Fld. 13/10, 5/1
CFSTI Prices: HC $3.00 MF $0.50
BUREAU OF SHIPS WASHINGTON D C
THE STANDARD NAVY MAINTENANCE AND MATERIAL MANAGEMENT SYSTEM (3-M), ITS STATUS AND APPLICATION,
by Anthony J. Ruffini. 1963, 51p.
Unclassified report

Presented at Association of Senior Engineers Annual Technical Symposium (3rd).

Descriptors: (*Naval equipment, Maintenance), (*Maintenance, Management planning), Management control systems, Naval personnel, Manpower studies, Naval vessels (Combatant), Naval vessels (Support), Maintainability, Military requirements, Data processing systems, Design, Costs, Standards

The paper defines and discusses both elements of the 3-M System initialed by the Chief of Naval Operations in March 1963, i.e. the Planned Maintenance System (PMS) and The Maintenance Data Collection System (MDCS) from a historical, current and future viewpoint. The PMS is a realistic minimum planned maintenance program which has proven to be a very effective management tool used to schedule, monitor, and manage maintenance. The Work Study technique used to develop planned maintenance requirements as well as the software and hardware associated with the System is discussed. The MDCS concept is discussed in considerable detail. It will be fleetwide superseding all other maintenance reports by January 1967. MDCS has been extended to tenders and is scheduled to be extended to shipyards. The products of the 3-M System has been used to a limited degree and will be used more extensively as a vital input to equipment design, maintainability, reliability, logistic and acquistion as well as personnel requirements and maintenance standards. (Author)

AD-631 148 Fld. 13/10
CFSTI Prices: HC $2.60 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C ACOUSTICS AND VIBRATION LAB
THE SIGNIFICANCE OF SHELL-LIKE VIBRATION OF NS SAVANNAH AT LOW FREQUENCIES.
Final rept.,
by John G. Viner. Mar 66, 21p. Proj. S-F013-11-08, Task 01351, DTMB 2152
Unclassified report

Descriptors: (*Cargo ships, Vibration), (*Nuclear powered vessels, Vibration), Low frequency, Ship hulls, Structural shells, Walls

The report examines the significance of shell-like behavior of NS Savannah at low frequencies as measured during underway vibration trials and as estimated by an analog study. In the vicinity of Bulkhead 80, out-of-phase motions were measured which cannot be predicted in any nonuniform bar approach to the analysis of a ship hull, but which might be predicted by treating the hull as a shell. However, examination of the maximum vertical vibration levels at filtered frequencies at this bulkhead showed that these motions were not significant. Vibration levels at blade frequencies indicated the presence of natural frequencies in which the largest amplitude occurred in the vertical direction and in which relatively large athwartship motion occurred, and vice versa. The significant frequencies obtained from vertically oriented transducers at Bulkhead 80 below 9 cps corresponded to hull flexural frequencies. The underway vibration survey gave no indication that shell-like behavior of Savannah is of any engineering

significance for mechanical suitability, ship habitability, and operability. (Author)

AD-630 566 See Fld. 11/9

AD-630 637 See Fld. 13/13

AD-630 709 See Fld. 20/4

AD-630 742 See Fld. 21/5

13/10.1 SUBMARINE ENGINEERING

AD-630 820 Fld. 13/10.1
CFSTI Prices: HC $3.00 MF $0.75
BUREAU OF SHIPS WASHINGTON D C
SUBMARINE MAIN BALLAST TANKS - THEORY AND METHODS FOR REFINED STRUCTURAL DESIGN,
by C. H. Pohler, A. A. Bement, D. S. Wilson, and W. A. Skinner. 1965, 99p.
Unclassified report

Presented at Association of Senior Engineers Annual Technical Symposium (3rd).

Descriptors: (*Ballast tanks, Design), (*Submarines, Ballast tanks), Structural properties, Theory, Pressure

Included is a discussion of the nature and history underlying the evolution of submarine ballast tanks, with reference to the Submarine Safety Program stemming from the loss of USS THRESHER. Theory and methods are developed for predicting the pressures applied to a ballast tank, and for the behavior of the tank structure under these pressures. Considered are variables of ballast tank and blow system configuration, initial transient loading and quasi-static pressures. Equations are developed to relate these variables and to determine the level of stress in any part of the tank structure, with theoretical development appended. General applications of these equations to analysis of a ballast tank are presented, with simplified curves and tables appended, and applicability to strutted sandwich shells other than ballast tanks indicated. Finally a complementary test program, established to confirm these equations and including large scale structural models and instrumented structural recovery trials, is briefly described. (Author)

AD-630 823 Fld. 13/10.1, 13/12
CFSTI Prices: HC $2.00 MF $0.50
BUREAU OF SHIPS WASHINGTON D C
OVERCOMING SUBMARINE CONTROL - SURFACE JAMS AND FLOODING CASUALTIES,
by Alfred J. Giddings, and William L. Louis.
1963, 37p.
Unclassified report

Presented at Association of Senior Engineers Annual Technical Symposium (3rd).

Descriptors: (*Submarines, *Accidents), (*Leakage (Fluid), Submarines), Failure (Mechanics), Pipes, Sea water, Penetration, Recovery, Safety, Underwater trajectories, Control systems, Malfunctions, Surfaces

A discussion of installed safeguards to prevent or minimize flooding is followed by explanation of the consequences of a submarine flooding casualty and the measures to be used to effect submarine recovery from flooding. The methods used to predict submarine trajectories are briefly presented, with special application to investigations of flooding. The appendices contain a more detailed discussion of predictions and an example. The consequences of control system malfunctioning and the reasons for selecting stern planes jams for investigating are outlined. Finally, methods for coping with a stern plane jam are presented. (Author)

AD-630 936 Fld. 13/10.1, 11/7
CFSTI Prices: HC $1.00 MF $0.50
NAVY MINE DEFENSE LAB PANAMA CITY FLA
AN INVESTIGATION OF THERMAL INSULATING MATERIALS FOR UNDERSEA HABITATS.
Interim rept. 1 Jul-15 Dec 65,
by Lawrence B. Taylor. Apr 66, 20p. Rept. no. i-98,
Proj. SF-111-01-03, Task 11275-26,
Unclassified report

Descriptors: (*Underwater vehicles, *Thermal insulation), Controlled atmospheres, Thermal conductivity, Heat transfer, Permeability, Helium, Theory, Reviews

Details and results of a literature search and study of thermal insulating materials for use at elevated pressures in atmospheres suitable for breathing are presented herein. Sufficient theory and data were found to permit determination of heat loss data of some insulating materials, assuming all the gas within the insulation was replaced by the breathing gas mixture. The accuracy of the theoretical values, the degree to which the gas mixture permeates the insulation, and the significance of the gas pressure in the permeation process remain to be determined experimentally. (Author)

13/11. PUMPS, FILTERS, PIPES, TUBING AND VALVES

AD-630 869 Fld. 13/11, 20/1
CFSTI Prices: HC $2.00 MF $0.50
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD
THE GENERATION, PROPAGATION, AND REDUCTION OF NOISE IN CIRCULATING WATER PUMPING SYSTEMS.
Research and development rept.,
by John W. Henry,IV, Charles G. Culver, and Thomas F. Ransick. Mar 66, 42p. Rept. no. MEL-116/65,
Proj. S-F013-11-09, Task 10444,
Unclassified report

Descriptors: (*Submarine noise, Pumps), (*Pumps, *Noise), (*Propeller pumps, Noise), (*Centrifugal pumps, Noise), Propagation, Reduction, Water, Analysis, Design, Acoustic properties, Turbulence, Pressure

Axial-flow pump noise generation was analyzed using dimensional analysis and aerodynamic theory, resulting in tentative design and operating criteria for low noise axial-flow pumps. Pump noise sources were also discussed in general terms. Problems concerning pump -generated acoustic pressure measurements, primarily piping system effects and turbulence, are also discussed. Future work will include verification of low noise design criteria for axial and centrifugal pumps, improvement of pump noise measurement, and development of novel pump designs having low noise characteristics. (Author)

AD-630 889 Fld. 13/11, 21/4
CFSTI Prices: HC $4.00 MF $1.00
LITTON SYSTEMS INC MINNEAPOLIS MINN APPLIED SCIENCE DIV
ELECTROHYDRODYNAMIC REMOVAL OF MICROORGANISMS FROM HYDROCARBON FUELS.
Final rept., 25 Jun 63-20 Nov 65,
by L. H. Ruhnke, E. Will, and P. Pederson. 20 Nov 65, 138p. Rept. no. ASD-2905,
Contract DA-19-129-AMC-141 (N), Proj. DA-1K012501A031 (05) ,ASD-51508
Unclassified report

Descriptors: (*Petroleum, Decontamination), (*Fuels, Decontamination), (*Microorganisms, *Electrostatic precipitation), Hydrodynamics, Fuel filters, Particles, Ionization, Glow discharges, Effectiveness, Hydrocarbons

The feasibility of removing microorganisms and other particulates from hydrocarbon fuels by electrostatic precipitation was studied. Theoretic investigations describe the physics of electrohydrodynamic precipitation and essential parameters influencing collection efficiency. Measurements of fuel characteristics and filter parameters have been made which led to the development of an electrohydrodynamic filter. Particulates and a liquid are unipolarly charged in a corona edge ioniser and then are flushed into a precipitation tube in which particulates are moved by Coulomb forces into porous non-conducting walls. A 10-gpm model showed filter efficiencies of a least 85 percent by number of particles larger than 1 micron diameter. The basic advantages of the method investigated are the low pressure drop over the filter element and the small size of the unit. (Author)

AD-631 004 Fld. 13/11, 20/4
CFSTI Prices:MF $1.00
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS
RESISTANCE COEFFICIENTS FOR STRUCTURAL PLATE CORRUGATED PIPE. HYDRAULIC MODEL INVESTIGATION.
Final technical rept.,
by John L. Grace Jr.. Feb 66, 126p. Rept. no. TR-2-715,
Unclassified report

Sponsored in part by Bureau of Public Roads, Washington, D. C.

Availability: U. S. Army Engineer Waterways Experiment Sta., Vicksburg, Miss. HC $1.50 CFSTI, MF $1.00.

Descriptors: (*Pipes, Fluid dynamic properties), (*Friction, Pipes), Structural parts, Hydraulic models, Configuration, Drag, Velocity, Pressure, Model tests

Model investigations were conducted in test sections simulating 5-, 10-, and 20-ft-diameter pipes, and the data obtained on hydraulic gradients, velocity distributions, and static pressure measurements were used to develop a mean flow equation with which the resistance coefficients due to the corrugations for all sizes of structural plate pipe can be computed. A method for determining the increment of resistance attributable to the assembly bolts of structural plate pipe is presented. In addition, empirical equations are developed that enable determination of the maximum values of the Darcy-Weisback f and the Manning's n for any diameter of corrugated pipe of the common structural plate and standard varieties as well as the relatively new type with annular 1- by 3-in. corrugations. (Author)

13/12. SAFETY ENGINEERING

AD-630 823 See Fld. 13/10

AD-630 932 See Fld. 22/2

13/13. STRUCTURAL ENGINEERING

AD-630 635 Fld. 13/13, 11/9, 13/3
CFSTI Prices: HC $4.00 MF $1.00
CINCINNATI UNIV OHIO
RESEARCH AND EXPERIMENTATION ON UNIQUE EXPANDABLE SHELTER CONCEPTS FOR LIMITED WAR APPLICATIONS.
Final technical rept., 23 Dec 63-4 Sep 65,
by James M. Alexander, and Karl H. Merkel. Dec 65, 143p. Contract AF 33 (615)-1285, Proj. AF-8174, Task 817403,
AFAPL TR-65-116
Unclassified report

Descriptors: (*Shelters, *Expandable structures), (*Expanded plastics, Shelters), Portable, Limited war, Configuration, Assembly, Tests, Hangars, Aircraft

Lightweight expandable shelters for limited war applications are described. Concepts for both small (16 ft wide) and large (50 ft wide) shelters are presented. Included in the small shelter section is the development of several different geometric configurations and methods of assembly. The construction, testing, and erection of prototype shelters based on two of the concepts are covered. Both shelters described utilize plastic foamboard as the basic construction material. Data on static load tests, erection time, package cubage, and package weight are included. Several structural concepts for the large shelter are presented. This structure, designed to serve as a hangar for a fighter aircraft, is carried through the concept stage only. The various concepts are described and sketches illustrating their key features are presented. (Author)

AD-630 637 Fld. 13/13, 13/10
CFSTI Prices: HC $3.00 MF $0.75
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF
HYDRAULIC-PNEUMATIC FLOATING FENDER -ADDITIONAL IN-SERVICE TESTS, FIRST SERIES.
Final technical rept., Mar 63-Jun 65,
by T. T. Lee. Mar 66, 83p. Rept. no. TR-R-430, Proj. Y-F015-10-03-303,
Unclassified report

See also AD-613 940.

Descriptors: (*Piers, Naval shore establishments), (*Marine safety equipment, Piers), Harbors, Floats, Ships, Walls, Mooring, Marine safety equipment, Hydraulic systems, Pneumatic systems, Containers, Air, Rubber

Tests of two experimental hydraulic-pneumatic floating fenders, first in a well-protected harbor (Port Hueneme) and then in a relatively exposed harbor (San Diego), are described. Each fender consists of a 50-foot-long bulkhead fronted by two air-filled and two water-filled rubber bags. Also included is information to aid engineers in increasing the energy-absorption capacity of existing dock fender systems. After 19 months of in-service tests of the floating fender it was concluded that (1) the energy-absorption capacity of the fender is adequate for a well-protected harbor such as that at Port Hueneme; (2) a fender system serving ships under navigation conditions and in a marine environment similar to those at Port Hueneme, requires a minimum energy-absorption capacity of 16 and a maximum of 50 inch-tons per 1,000 tons of ship displacement; and (3) resistance to ship motion, including the hydrodynamic mass effect, is an important parameter which requires further investigation. It is recommended that (1) full-scale tests of berthing impact be continued, particularly at exposed harbors, to determine energy requirements for other fender designs and (2) model tests of berthing impact be initiated, particularly of the resistance to motion, for use in evaluating hydrodynamic mass. Although measurements were not made at San Diego, it is concluded that the fenders provided satisfactory service but were not loaded to capacity. (Author)

AD-630 843 Fld. 13/13
CFSTI Prices: HC $3.00 MF $0.75
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF CIVIL ENGINEERING
EFFECTS OF IMPULSIVE LOADS ON FIBER-REINFORCED CONCRETE BEAMS.
Final summary rept.,
by James P. Romualdi, and Melvin R. Ramey. Oct 65, 89p. Contract OCD-PS-64-21, Proj. 1100,
Unclassified report

Descriptors: (*Concrete, Beams (Structural)), (*Beams (Structural), Loading (Mechanics)), Reinforcing materials, Steel, Fibers, Fiber metallurgy, Impact tests, Fracture (Mechanics), Tensile properties, Shelters, Construction

The study investigates the effects of destructive impulsive loads on concrete made with steel fiber reinforcement. Analysis of the data led to the following conclusions: (1) The impulsive loading does not cause the sudden failure in the beams with fiber reinforced concrete that is observed in the case of conventional concrete beams. (2) The internal resisting moment is significantly greater in the case of beams made with fiber reinforced concrete. (3) Failure of the compressive zone in beams with fiber reinforced concrete is not sudden but is preceded by extensive deformation. (4) The increased tensile strength of fiber reinforced concrete permits its use without special shear reinforcement.

AD-630 600 **See Fld. 11/4**

AD-630 918 **See Fld. 5/1**

AD-631 028 **See Fld. 18/3**

Field 14-METHODS AND EQUIPMENT

14/1. COST EFFECTIVENESS

AD-631 090 Fld. 14/1, 13/8, 5/1
CFSTI Prices: HC $3.00 MF $0.50
STANFORD UNIV CALIF DEPT OF INDUSTRIAL ENGINEERING
QUALITY COST ANALYSIS IMPLEMENTATION HANDBOOK,
by Donald E. Morgan, and W. Grant Ireson. 15 Sep 64, 51p. Contract AF 18 (600)-2021,
Unclassified report

Descriptors: (*Cost effectiveness, Handbooks), (*Quality control, Costs), Optimization, Management planning, Management control systems

The QUICO (Quality Improvement through Cost Optimization) system covers the planning, installation, and use of quality cost data analysis. The basic idea is simply to operate a manufacturing unit or complex so that the total of quality related costs is a minimum. Quality related costs are made up of (1) expenses incurred because of not producing the highest possible quality (resultant costs), (2) expenditures made to create conditions resulting in high quality products (quality creation costs), and (3) expenditures made to measure quality levels being produced and causes of deficiencies (quality and defect inference costs). Analysis of quality cost data provides direct pay-offs in reduction of resultant costs and the major sources are discussed. Secondary benefits come from use of the data as a measurement of the effectiveness of the quality assurance effort, as a motivant to workers who must produce the high quality, and as a management guidance tool. Suggested cost accounts are given along with suggested methods of summarizing and displaying data in the most meaningful way for all levels of use. Almost all companies now have sufficient cost data to estimate cost reductions to be expected from the QUICO system. (Author)

AD-631 169 Fld. 14/1, 15/5
CFSTI Prices: HC $2.00 MF $0.50
RAND CORP SANTA MONICA CALIF
COST ANALYSIS: CONCEPTS AND METHODS OUTLINE,
by M. A. Margolis. Apr 66, 35p. Rept. no. P-3344,
Unclassified report

To be presented as part of a lecture series sponsored by the American Inst. of Aeronautics and Astronautics, April 13, 1966.

Descriptors: (*Cost effectiveness, *Weapon systems), Uncertainty, Logistics

AD-630 757 **See Fld. 5/1**

AD-631 075 **See Fld. 12/2**

14/2. LABORATORIES, TEST FACILITIES, AND TEST EQUIPMENT

AD-630 678 Fld. 14/2, 7/2
CFSTI Prices: HC $1.00 MF $0.50
FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY
A NEW, HIGH SENSITIVITY GAS CHROMATOGRAPHIC DETECTOR WITH RESPONSE BASED ON DIELECTRIC PROPERTIES OF CONSTITUENTS.
Final scientific rept., 1 Sep 64-28 Feb 66,
by James D. Winefordner. 28 Feb 66, 4p. Contract AF-AFOSR-739-65,
AFOSR 66-0609
Unclassified report

Descriptors: (*Gas chromatography, *Dielectric properties), Gases, Organic compounds, Chemical analysis, Oscillators, Molecules, Radiofrequency, Glow discharges

A detector was developed consisting of 2 Clapp oscillators that were beat, by a diode mixer circuit, to give a difference frequency that was measured by use of a frequency meter and a recorder. The tank circuit of the sample oscillator contained a cylindrical condenser through which the carrier and sample gases passed; the reference oscillator had a variable air capacitor in the tank circuit. The response of this detector was several orders of magnitude greater than would be predicted for an ideal dielectric constant recorder. The same circuitry could be used for either an RF or a dielectric constant detector, i.e. if a high Q tank coil and a capacitor with closely spaced plates were used, an RF detector resulted, but if the tank were of lower Q and the capacitor had wider plate spacing or large plate area, a dielectric constant resulted. A study was then undertaken to optimize experimental parameters. For most molecules, the limiting detectable sample size is about 10 to the -10th power grams per second, and the range of sample sizes over which near linearity of response occurs is about 1000-fold for non-organic gases.

AD-630 750 Fld. 14/2, 20/13
CFSTI Prices: HC $1.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
THERMOCOUPLE CORRECTIONS FROM IRREVERSIBILITY THEORY.
Technical summary rept.,
by R. A. Gaggioli, and J. W. Mitchell. Jan 66, 14p. Rept. no. MRC-TSR-620,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Thermocouples, Corrections), (*Thermodynamics, Irreversible processes), Thermoelectricity, Electrical impedance, Errors, Voltage, Resistance (Electrical), Temperature, Electrical conductance, Electric wire

The resultant error introduced by using finite impedance measuring instruments in thermocouple circuits was determined quantitatively and rigorously. The standard-practice correction formula to account for finite impedance of measuring instruments in thermocouple circuits is valid (provided there are no excessive radial temperature and voltage gradients). The measured voltage can be corrected to give voltage values for use with standard tables. The analysis shows that error is reduced by decreased thermocouple circuit resistance R (TC) (including all lead wires) and increased instrument impedance (internal impedance of instrument alone). The effect of the temperature dependence of the electrical conductivity and the absolute thermoelectric power are exactly accounted for by an equation which requires that the total resistance R (TC), which is dependent upon

the temperature variation along the wires, be determined. A procedure was also indicated that minimizes the effect of unequal lead-wire junction temperatures.

AD-630 801 Fld. 14/2, 22/3
CFSTI Prices: HC $3.00 MF $0.75
PHYSICS INTERNATIONAL CO SAN LEANDRO CALIF
EXPLOSIVE GAS GUN FOR RE-ENTRY SIMULATION.
Final rept.,
by Douglas Mumma. 24 Nov 65, 78p. Rept. no. PIFR-024,
Contract DA-04-200-AMC-796 (X),
Unclassified report

Descriptors: (*Atmosphere entry, Simulation), (*Light gas guns, *Hypervelocity guns), (*Reentry vehicles, Simulation), Explosion gases, Acceleration, Propulsion, Model tests, Spacecraft, Hypervelocity projectiles, Aerodynamics

An inexpensive high explosive gas gun using new concepts has been developed launching intact plastic projectiles, weighting from 4 gms to 100 gms to velocities in excess of 6 mm/microsec. A 2.3-kgm projectile was launched at similar velocity, but broke into discrete pieces. The cause of fragmentation is thought to be the method of seating the projectile. The design has proved to be scalable by a factor of 8, and launches projectiles reproducibly. (Author)

AD-630 850 Fld. 14/2
CFSTI Prices: HC $1.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
EXPERIMENTAL INVESTIGATION OF THE EFFECT OF IMPACT OVERLOADS ON CLOCKWORKS,
by A. P. Isaev. Feb 66, 16p. Rept. no. FSTC-HT-23-35-66,
Proj. 2301-6553,
TT 66-60955
Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Priborostroenie (USSR) n5 p88-94 1960.

Descriptors: (*Clocks, *Impact shock), Test equipment, Experimental data, USSR

The article describes a device created by the author to test clock components and mechanisms for impact overloads up to 50,000 g. The impact is created by dropping a tempered steel striker with the test object on a steel surface, with the striker drop height determining the overload. The article presents a procedure for measuring magnitude of acceleration with a piezoelectric crystal pickup and describes experimental tests conducted on balance units of aircraft timepieces and K-26 timepieces, as well as 'Rossiya' timepieces. The author suggests a design for a shockproof balance unit which uses elongated pivots. (Author)

AD-630 851 Fld. 14/2
CFSTI Prices: HC $2.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
CERTAIN PROBLEMS IN THE DYNAMICS OF ESCAPEMENT REGULATORS WITHOUT NATURAL VIBRATIONS OF THE BALANCE,
by E. V. Kulkov. Feb 66, 28p. Rept. no. FSTC-HT-23-36-66,
Proj. 2301-6553,
TT 66-60956
Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Priborostroenie (USSR) n5 p95-105 1960.

Descriptors: (*Clocks, Dynamics), Control systems, Balances, USSR

The article presents theoretical principles for calculating the vibration period of clock escapement regulators without natural vibrations, taking into account the effect of dynamic factors on the magnitude of the period. The formulas obtained contribute to an understanding of certain laws governing the operation of these regulators (slight dependence of the balance's vibration range upon the moment of the motive force, the negligible influence of great changes in the moment of inertia of the train upon the magnitude of the vibration period etc.) and may be useful in the designing of clockworks and the calculation of vibration periods. (Author)

AD-630 852 Fld. 14/2, 20/11
CFSTI Prices: HC $1.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
ON AVERAGE AND FINITE PARAMETERS OF THE INTERMITTENT MOTION IN PIN-TYPE ESCAPEMENTS,
by E. V. Kulkov. Feb 66, 15p. Rept. no. FSTC-HT-23-38-66,
Proj. 2301-6553,
TT 66-60957
Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Priborostroenie (USSR) n2 p101-10 Mar-Apr 1961.

Descriptors: (*Clocks, Dynamics), Equations of motion, USSR

The article deals with a certain class of intermittent -motion mechanisms, namely pin-type escapements in regulators without free vibration. A kinematic analysis and displacement diagrams indicate that in practical design calculations it is necessary to consider only the motion (pulse) along the tooth of the ratchet-wheel even though the motion (pulse) along the pin pallet of the pendulum (balance-wheel) may constitute 20% or more of the total motion. (Author)

AD-630 853 Fld. 14/2
CFSTI Prices: HC $1.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
EXPERIMENTAL STUDY OF THE EFFECT ON VIBRATIONS ON FRICTION IN THE CYLINDRICAL GUIDE-BEARINGS FOR A BALANCE-WHEEL SPINDLE,
by A. P. Isaev. Mar 66, 16p. Rept. no. FSTC-HT-23-40-66,
Proj. 2301-6553,
TT 66-60958
Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Priborostroenie (USSR) n4 p101-8 Jul-Aug 1961.

Descriptors: (*Chronographs, Instrumentation), USSR, Bearings, Antifriction bearings, Friction, Torque, Vibration, Cylindrical bodies

The article presents the results of an experimental study pertaining to the effect of vibration on the friction torque in balance-wheel spindles and bearings of chronometers in general but 'Pobeda' and aviation instruments in particular. The effect of rotational speed and radial clearance between spindle journal and bearing bore, also the effect of themagnitude of a vibrational overload were tested. The significance of the position of the spindle relative to the earth's gravitational field is discussed. It is shown that the frictional torque can be made constant regardless of the angle of inclination of the spindle. The mutual relation between frictional torque and impact torque due to vibration is analyzed, and it is explained why, at vibrational overloads larger than 1 g, the impace torque becomes equal to zero. The impact torque refers to the spindle journal striking the inner bearing surface,'while between strikes the spindle is in a suspended position. (Author)

AD-630 902 Fld. 14/2, 8/12
CFSTI Prices: HC $3.00 MF $0.75
MIAMI UNIV CORAL GABLES FLA SCHOOL OF ENGINEERING
MEASUREMENT OF NATURAL PARTICULATE FALLOUT ONTO HIGH POLAR ICE SHEETS. PART I. LABORATORY TECHNIQUES AND FIRST RESULTS.
Research rept.,
by Henri Bader, Wayne L. Hamilton, and Paul L. Brown. Nov 65, 92p. Contract DA-ENG-27-021-62-G2, Task DA-IV014501B52A03, CRREL RR-139
Unclassified report

Descriptors: (*Glaciers, Impurities), (*Ice, Antarctic regions), (*Particle size, Laboratory equipment), Snow, Stratigraphy, Well logging, Test methods, Test equipment, Calibration

The paper describes specifications for the laboratory, the purification of tap water for use as wash water and in making moderately clean NaCl solutions, the cleaning of glassware, the preparation and cleaning of NaCl solutions, the processing of ice samples, the measurement of electrical conductance, the Goulter particle counter and its use, and some of the underlying principles. The equipment used is identified and some first results obtained on cores from Byrd Station, Antarctica, are presented. (Author)

AD-630 929 Fld. 14/2, 9/5
CFSTI Prices: HC $2.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
THE QUESTION OF CALCULATING THERMAL COMPENSATION IN OSCILLATORY CIRCUITS AND STABILIZATION OF THE OSCILLATION PERIOD OF THE BALANCE WHEEL IN A NEW TYPE ESCAPEMENT REGULATOR WITH RESTRICTED MOVEMENT,
by L. D. Vishnevskii, and Z. M. Akselrod. Feb 66, 33p. Rept. no. FSTC-HT-23-39-66,
Proj. 2301-6553,
TT 66-60983
Unclassified report

Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Priborostroenie (USSR) n3 p11-8, 83-94 May-Jun 1961.

Descriptors: (*Circuits, Capacitors), (*Clocks, Stabilization systems), Oscillators, Balances, Dynamics, Temperature, USSR

A method is presented for selecting the values of capacitors to be used in the temperature-compensating circuits of temperature-stable oscillators. Parallel and series connected compensators are considered. Temperature compensation by variable capacitor is briefly discussed. A new type of escapement regulator, with restricted movement is described, and its dynamic characteristics are presented. In the new type escapement, the geared wheel moves one notch when the balance wheel, with one slot, moves in one direction, remaining stationary when the balance wheel returns. The simplified design makes the period less dependent on the force applied to the movement wheel. (Author)

AD-630 975 Fld. 14/2
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
CONTACTLESS METHOD OF MEASURING TRUE TEMPERATURES,
by A. I. Mazo. 17 Mar 66, 8p. Rept. no. FTD-TT-65-1392,
TT 66-60991
Unclassified report

Unedited rough draft trans. of Patent (USSR) 167328, appl. 823819/26-10, 7 Mar 63.

Descriptors: (*Temperature, Measuring devices (Electrical + electronic), (*Thermomet-

ers, Patents), Semiconductor devices, Photoelectric cells (Semiconductor), USSR

Object of the Invention: A contactless method of measuring the true temperatures of heated bodies which has the distinguishing feature that for the purpose of improving the precision of the measurement through the elimination of the effect of the properties of an intervening medium simultaneously, there are used two types of pickups, for example, a semiconductor thermal element and a photoelement or photoresistor with a narrow-band light filter, the signals from which after amplification and differentiation are compared inside each channel with the derivative of the time signal, after which the signals are compared with each other, and the results of the comparison are taken from an automatic recording instrument. (Author)

AD-631 050 Fld. 14/2, 13/8, 9/3
CFSTI Prices: HC $1.00 MF $0.50
CTS CORP ELKHART IND RESEARCH AND DEVELOPMENT DIV
PRODUCTION ENGINEERING MEASURE FOR SUBMINIATURE, TRANSISTOR TYPE POTENTIOMETERS.
Quarterly progress rept. no. 18, 1 Oct-31 Dec 65,
by C. L. Holmes, and D. C. Kinsey. 31 Dec 65, 12p. Contract DA-36-039-sc-85976,
Unclassified report

See also AD-628 280.

Descriptors: (*Potentiometers, Manufacturing methods), (*Subminiature electronic equipment, Potentiometers), Transistors, Production control, Moisture, Life expectancy, Reliability (Electronics), Test methods, Tests

A total of 300 subminiature potentiometers were fabricated for retesting on rotational life and moisture resistance. Technical Action Request No. 9 was submitted to obtain approval of the moisture resistance test equipment at CTS of Berne, Berne, Indiana. After approval of the test facility was obtained, 100 potentiometers of the 50 ohm bushing mount style and 100 of the 50 ohm flat mount style were placed on the moisture resistance test. The 100, 25,000 ohm bushing mount controls were submitted to rotational life test. (Author)

AD-631 065 Fld. 14/2, 20/4
CFSTI Prices: HC $22.60 MF $1.25
TORONTO UNIV (ONTARIO) INST FOR AEROSPACE STUDIES
HYPERVELOCITY LAUNCHERS. PART 2: COMPOUND LAUNCHERS - DRIVING TECHNIQUES,
by I. I. Glass. Dec 65, 230p. Rept. no. UTIAS-Review-26,
Contract AF 33 (615)-2766,
Unclassified report

Descriptors: (*Hypervelocity guns, Interior ballistics), Atmosphere entry, Impact shock, Gas flow, Aerodynamic configurations, Launching, Combustion chamber gases, Heating, Pressure, Canada, Reviews

The critical survey of hypervelocity launchers and their research applications to reentry physics, hypervelocity impact, gasdynamics and aerodynamics, which was started in Part I (AD-419 112) is continued in the present report. The various subsections consider the improvements that may be obtained over a simple launcher by using chambrage, combustion drivers, piston compressors, and electrical discharges. It is shown that although significant but modest improvements are obtained, these techniques do not appear to offer actual and startling increases in muzzle velocities. Consequently, novel methods will have to be employed in order to achieve the desirable current hypervelocities of integral aerodynamic shapes at 50,000 ft/sec or greater. The application of implosion wave dynamics appears to offer such a possibility. (Author)

AD-631 183 Fld. 14/2, 11/6, 13/8
CFSTI Prices: HC $3.00 MF $0.75
MATERIALS ADVISORY BOARD NAS-NRC WASHINGTON D C
EVALUATION TEST METHODS FOR BERYLLIUM.
Mar 66, 57p. Rept. no. MAB-205-M,
Contract SD-118,
Unclassified report

Rept. of Test Methods Subcommittee, Committee of Beryllium Metallurgy.

Descriptors: (*Beryllium, Test methods), Mechanical properties, Tensile properties, Elasticity, Bending, Standards

The report was prepared to establish standardized methods and procedures for conducting mechanical property tests on beryllium. The data presented are restricted to information which is well established and accepted, but the report also identifies areas of testing controversy and highlights current technical needs in the testing area. The report attempts to document recommended methods, based on a review of the procedures used in a number of organizations. For various reasons, many will want to deviate from these methods. To permit reliable inter-comparisons between laboratories, standardized methods are needed; and it is hoped that for this reason these methods will be adopted. Recommended procedures for tensile, 3-point bend, 4-point bend and precision elastic limit tests are described. (Author)

AD-630 616 **See Fld. 7/4**

AD-630 652 **See Fld. 13/8**

AD-630 668 **See Fld. 4/2**

AD-630 702 **See Fld. 17/2**

AD-630 706 **See Fld. 4/2**

AD-630 741 **See Fld. 8/3**

AD-630 760 **See Fld. 20/11**

AD-630 770 **See Fld. 17/1**

AD-630 813 **See Fld. 4/2**

AD-630 826 **See Fld. 21/5**

AD-630 871 **See Fld. 11/6**

AD-630 909 **See Fld. 11/10**

AD-630 931 **See Fld. 20/2**

AD-630 971 **See Fld. 11/6**

AD-630 989 **See Fld. 17/2**

AD-630 993 **See Fld. 6/16**

AD-631 080 **See Fld. 20/1**

AD-631 179 **See Fld. 20/2**

14/4. RELIABILITY

AD-630 865 Fld. 14/4, 9/3
CFSTI Prices: HC $2.00 MF $0.50
MAGNAVOX CO FORT WAYNE IND GOVERNMENT AND INDUSTRIAL DIV
C-6365/ARC-34C RADIO SET CONTROL.
Reliability rept., Production reliability acceptance test no. 2, 2-15 Sep. 65.
15 Sep 65, 36p. Contract AF 33 (657)-14120 ,AF 33 (657)-14497
Unclassified report

Descriptors: (*Channel selectors, Radio equipment), (*Radio equipment, Reliability (Electronics)), (*Reliability (Electronics), Test methods), Quality control, Tuning devices, Electronic switches, Failure (Electronics), Life expectancy, Tests

This report presents the results of the Second Production Reliability Acceptance Test on the C-6365/ARC-34C Radio Set Control. This test was conducted between 2 September 1965 and 15 September 1965. An accept decision was reached on 15 September 1965 with five (5) relevant failures. The total accumulated test time, at the time of the accept decision, was 6300.0 hours (8.4 normalized test times). (Author)

AD-630 784 **See Fld. 9/1**

AD-630 809 **See Fld. 12/1**

AD-630 810 **See Fld. 12/1**

AD-630 811 **See Fld. 12/1**

AD-630 821 **See Fld. 13/10**

14/5. REPROGRAPHY

AD-630 882 Fld. 14/5, 15/7
CFSTI Prices: HC $2.00 MF $0.50
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
PROJECT AMPIRT SECOND TEST PERIOD REPORT.
Special interim rept. no. 3, and Interim technical rept. no. 1,
by John E. Walker, and George H. Snider. Aug 65, 38p. Rept. no. CAL-VE-2027-D-3,CAL-VE-1931-D-3
Contract AF 30 (602)-3541 ,AF 33 (657)-13172
Unclassified report

Descriptors: (*Aerial photography, Photointerpretability), (*Aerial reconnaissance, Aerial photography), (*Photographic reconnaissance, Aerial photography), Photographic equipment, Environmental tests, Thailand

This report presents a chronological summary of the conduct of the photographic tests on the second field trip to Thailand, 1 June 1965 through 10 July 1965. Of the 479 rolls of 70 mm film which were planned to be exposed, 352 rolls of imagery were obtained for analysis. (Author)

AD-631 072 **See Fld. 8/2**

AD-631 178 **See Fld. 5/9**

Field 15-MILITARY SCIENCES

15/2. CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL WARFARE

AD-630 802 Fld. 15/2, 6/6, 6/13, 6/5
CFSTI Prices: HC $3.00 MF $0.75
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
CBE FACTORS: MONTHLY SURVEY NO. 3.
ATD work assignment no. 50.
1966, 89p. Rept. no. ATD-66-22,
TT 66-60936
Unclassified report

See also AD-628 848.

Descriptors: (*Chemical warfare agents, Reviews), (*Biological warfare agents, Reviews), (*Environment, Reviews), Pesticides, Herbicides, Fertilizers, Hallucinogens, Diseases, Disease vectors, Microorganisms, Immunology, Aerosols, Ecology, Micrometeorology, Soils, Epidemiology, Toxicology, Abstracts, USSR

The survey is based on Communist World open sources. It is the third in a series of monthly surveys covering the following areas: I. Chemical factors (pesticides, herbicides, fertilizers, psychotomimetics, other chemicals); II. Biological factors (pathogens); III. Environmental factors (aerosols, ecology, micrometeorology, soil science). Available translations of additional sources pertinent to the three subject areas are listed in an appendix. Titles of publications cited are also listed alphabetically in an appendix. There is no bibliography. (Author)

15/3. DEFENSE

AD-631 026 Fld. 15/3, 18/3, 15/6
CFSTI Prices: HC $11.60 MF $0.75
INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA ECONOMIC AND POLITICAL STUDIES DIV
NUCLEAR BLAST EFFECTS ON A METROPOLITAN ECONOMY,
by William C. Truppner. Sep 65, 117p. Rept. no. Study-S-209,IDA/HQ-65-4208
Contract OCD-OS-63-134,
Unclassified report

Descriptors: (*Urban areas, *Nuclear explosion damage), (*Civil defense systems, *Blast), Urban areas, Industries, Economics, Labor, Population, Nuclear warfare casualties, Texas, Industrial production

The study summarizes the work done to develop a method for measuring the nuclear blast effects on the economic resources of a single city. The method developed was applied to data describing the Houston, Texas, Standard Metropolitan Statistical Area. The results were expressed in terms of weapon effects on economic output, property values, and population characteristics including the experienced labor force. The study indicates the methods used to obtain the input data required to analyze weapon effects on the economy of a large metropolitan area. The study also includes a description of the problems encountered in developing the data and the steps taken to overcome such difficulties. These data were distributed to single cells of a 65 x 65 one-kilometer square matrix which was used to measure overpressure effects on economic resources for eight weapons of yields ranging from 0.1 megaton to 100 megatons. Weapon effects on economic resources were related to effects on the population of Houston for the same simulated attack conditions. (Author)

15/3.1 ANTIMISSILE DEFENSE

AD-630 877 Fld. 15/3,1
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
SOVIET ANTI-MISSILE DEFENSE,
by J. R. Konieczniі. 21 Jan 66, 6p. Rept. no. FTD-TT-65-1618,
TT 66-60970
Unclassified report

Unedited rough draft trans. of Wojskowy Przeglad Lotniczy (Poland) n1 p86-7 1965.

Descriptors: (*Antimissile defense systems, USSR), Radar tracking, Guided missile detection, Weapon systems, State-of-the-art review

15/4. INTELLIGENCE

AD-630 761 **See Fld. 5/2**

AD-631 178 **See Fld. 5/9**

15/5. LOGISTICS

AD-631 079 **See Fld. 5/1**

AD-631 169 **See Fld. 14/1**

AD-631 186 **See Fld. 1/3**

15/6. NUCLEAR WARFARE

AD-631 026 **See Fld. 15/3**

15/7. OPERATIONS, STRATEGY, AND TACTICS

AD-630 774 Fld. 15/7
CFSTI Prices: HC $9.60 MF $0.75
SPECIAL OPERATIONS RESEARCH OFFICE WASHINGTON D C COUNTERINSURGENCY INFORMATION ANALYSIS CENTER
BIBLIOGRAPHY ON COUNTERINSURGENCY, UNCONVENTIONAL WARFARE, AND PSYCHOLOGICAL OPERATIONS: SUPPLEMENT NO. 8,
by Nancy Currier, Dennis Gosier, and Heidi Berry. Feb 66, 99p. Contract DA-49-092-ARO-7,
Unclassified report

Descriptors: (*Counterinsurgency, Bibliographies), (*Bibliographies, Counterinsurgency), (*Unconventional warfare, Bibliographies), (*Psychological warfare, Bibliographies)

This is a bibliography of unclassified, English-language books and articles on counterinsurgency, unconventional warfare, and psychological operations. Within each of these subjects the entries are categorized and cross-referenced by specific problem and area, and indexed by author and title. (Author)

AD-631 088 Fld. 15/7
CFSTI Prices: MF $0.50
DEPARTMENT OF THE ARMY WASHINGTON D C
ON SOVIET MILITARY ART IN THE BATTLE OF THE VOLGA; THE SIXTH GUARDS TANK ARMY IN THE KHINGANO-MUKDEN OPERATION,
by P. Rotmistrov. Dec 62, 11p. Rept. no. I-8277A
Unclassified report

Voienno-istoricheskii zhurnal, 12 (Military Historical Journal, No. 12), Moscow, 1962. Availability: Microfiche only after original copies exhausted.

Descriptors: (*Military strategy, USSR), (*Warfare, History), Armed forces (Foreign), Military tactics, Armed forces operations, Defense systems, Countermeasures, Antitank ammunition, Tanks (Combat vehicles)

AD-631 089 Fld. 15/7
CFSTI Prices: MF $0.50
ASSISTANT CHIEF OF STAFF FOR INTELLIGENCE (ARMY) WASHINGTON D C
THE SIXTH GUARDS TANK ARMY IN THE KHINGANO-MUKDEN OPERATION,
by I. Krupchenko. 28 Feb 66, 11p. Rept. no. I-8277-B
Unclassified report

Descriptors: (*Military strategy, USSR), (*Warfare, History), Armed forces (Foreign), Military tactics, Armed forces operations, Defense systems, Countermeasures, Antitank ammunition, Tanks (Combat vehicles)

AD-630 882 **See Fld. 14/5**

AD-630 908 **See Fld. 11/3**

Field 16-MISSILE TECHNOLOGY

16/1. MISSILE LAUNCHING AND GROUND SUPPORT

AD-630 813 **See Fld. 4/2**

AD-631 181 **See Fld. 13/2**

16/4. MISSILES

AD-630 932 **See Fld. 22/2**

16/4.1 AIR- AND SPACE-LAUNCHED MISSILES

AD-630 876 Fld. 16/4.1
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
PERFECTIONS IN THE FIELD OF PREPARING AIR-TO-AIR CLASS ROCKET MISSILES,
21 Jan 66, 6p. Rept. no. FTD-TT-65-1613, TT 66-60969
Unclassified report

Unedited rough draft trans. of Wojskowy Przeglad Lotniczy (Poland) n8 p82-4 1963.

Descriptors: (*Guided missiles (Air-to-air), Installation), Control systems, Transportation, Cargo vehicles, Poland, USSR, Transporter-erectors

An account is given of Soviet measures taken to service air-to-air guided missiles prior to their suspension in aircraft. Special movable vehicles were used on which were placed the control-measuring apparatus, oscillograph, rectifier, and sensitive signal generators. Other vehicles are used for transporting the rocket missiles from the point of preparation to aircraft.

Field 17-NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

17/1. ACOUSTIC DETECTION

AD-630 770 Fld. 17/1, 9/1, 20/1, 14/2
CFSTI Prices: HC $1.00 MF $0.50
NAVY UNDERWATER SOUND LAB NEW LONDON CONN
BROAD BANDWIDTH FREE-FLOODING MAGNETOSTRICTIVE SCROLL TRANSDUCERS.
Research rept.,
by Theodore J. Meyers. 22 Mar 66, 20p. Rept. no. USL-723,
Proj. SF-101-03-18-8044 ,USL-1-450-00-00
Unclassified report

Descriptors: (*Transducers, *Magnetostrictive elements), Underwater equipment, Rings, Cavity resonators, Resonant frequency, Broadband, Acoustics

Free-flooding magnetostrictive scroll transducers are rugged and reliable and are relatively insensitive to hydrostatic pressure; however, they normally have a relatively narrow bandwidth. This report describes the experimental results achieved in broadening the bandwidth of free-flooding magnetostrictive scroll transducers by coupling the cavity and ring resonances of the scrolls. Transducers with varying degrees of coupling between the cavity and ring resonances are considered. It would appear that the cavity resonance may have important use in this type of transducer and is deserving of further serious consideration. (Author)

AD-631 105 Fld. 17/1, 8/11, 18/3
CFSTI Prices: HC $2.60 MF $0.50
TELEDYNE INDUSTRIES INC ALEXANDRIA VA EARTH SCIENCES DIV
LONG RANGE SEISMIC MEASUREMENTS - YUBA.
Scientific rept.,
by Don M. Clark. 17 Mar 66, 30p. Rept. no. SDL-140,
Contract AF 33 (657)-15919,ARPA Order-624 Proj. T/6702.
Unclassified report

Descriptors: (*Seismology, *Nuclear explosions), (*Underground explosions, Acoustic detectors), Earthquakes, Explosions, Seismic waves, Identification systems

An analysis of seismological data from an underground nuclear explosion as a continuing study to provide information to aid in distinguishing between earthquakes and explosions. A table of travel-times and amplitudes of P, Pg, Lg, and surface waves are included along with other unidentified phases. (Author)

AD-631 080 **See Fld. 20/1**

AD-631 146 **See Fld. 8/10**

17/2. COMMUNICATIONS

AD-630 567 Fld. 17/2, 9/1, 10/2
CFSTI Prices: HC $1.00 MF $0.50
MONTANA STATE UNIV BOZEMAN ELECTRONICS RESEARCH LAB
A SURVEY OF SOLID STATE D.C. POWER SUPPLY CONFIGURATIONS FOR HIGH POWER.
Final rept., Task C,
by George Berges. Sep 65, 13p. Contract N123 (953)53308A
N66 10717
Unclassified report

Descriptors: (*Power supplies, Public address systems), (*Public address systems, Shipborne), Semiconductor devices, Transformers, Communication systems

In order to produce the most efficient and reliable communication system for shipboard use by the U. S. Navy, it is proposed that P.A. couplers of an octave range be used instead of conventional 2-32 mc transmitters. This configuration will require a considerably greater number of P.A. couplers; however, the amplifier per unit cost and complexity is greatly reduced. However, at 10 kw power level, the power supply of each P.A. becomes significant in size and weight. If the proposed system is to be feasible, considerable size and weight must be saved over conventional 60-cycle power supply designs. The purpose of this cursory study is to do preliminary investigation into power supply size and weight savings with an eye on cost. Two different supplies are being considered: a unit, 16 KVA supply, to power an individual P.A. coupler; and a composite, 160 KVA supply, to power 10 units from a central point.

AD-630 574 Fld. 17/2, 5/7, 6/3
HASKINS LABS NEW YORK
AN ELECTROMYOGRAPHIC STUDY OF THE TONGUE DURING VOWEL PRODUCTION,
by Peter F. MacNeilage, and George N. Sholes.
13 May 64, 24p. Contract PHS-DE-01774,
Unclassified report

Availability: Published in Journal of Speech and Hearing Research v7 n3 p209-32 Sep 1964. Copies to DDC users only.

Descriptors: (*Speech, *Tongue), Phonetics, Muscles

Surface electromyograms were recorded from 13 locations on the tongue of one subject during production of 17 different types of (p)-vowel- (p) monosyllables. Results were considered together with X-ray data on tongue action, and anatomical information on tongue musculature, in an attempt to describe the action of tongue muscles during vowel production. It proved possible in most cases to assign muscles, with some certainty, to the major features of myographic activity, and to indicate what function the muscle was serving. The results have particular relevance to theories of sequential speech production, and indirectly, theories of speech perception, as they provide a basis for description of how coarticulation of vowels with consonants involving the tongue takes place. (Author)

AD-630 576 Fld. 17/2, 5/7
UNIVERSITY COLL LONDON (ENGLAND)
THE IDENTIFICATION AND DISCRIMINATION OF SYNTHETIC VOWELS,
by D. B. Fry, Arthur S. Abramson, Peter D. Elimas, and Alvin M. Liberman. 1962, 20p.
Unclassified report

Availability: Published in Language and Speech v5 pt4 p171-89 Oct-Dec 1962. Copies to DDC users only.

Descriptors: (*Speech, Analysis), (*Phonetics, Analysis), English language, Phonetics, Perception

A series of thirteen two-formant vowels was synthesized and used as the basis of labelling and discrimination tests with a group of English-speaking listeners. The sounds varied only in F1/F2 plot and the resulting vowel qualities were such that listeners found no difficulty in assigning each sound to one of three phonemic categories, those of the vowels in bid, bed and bad. The results of the tests were compared with those previously obtained in experiments involving the consonant phonemes /b, d, g/. It appears from the data that the phoneme boundaries in the case of the three vowel phonomes are less sharply defined than in the case of the stop consonants. The labelling functions for the vowels show a gradual slope and the discrimination functions do not show any marked increase in sensitivity to change in the region of the phoneme boundaries. It is clear also that the listeners were able to discriminate differences very much smaller than would need to be distinguished simply in order to place vowels in the appropriate category. The results show further that the effect of sequence of acoustic context in the perception of vowels is very considerable. In all the aspects examined in these experiments, the perception of synthetic vowels is found to be different from that of synthetic stop consonants. These differences lend some support to the hypothesis that the degree of articulatory discontinuity between sounds may be correlated with the sharpness of the phonemic boundaries that separate them.

AD-630 623 Fld. 17/2
CFSTI Prices: HC $7.00 MF $1.50
ITT FEDERAL LABS NUTLEY N J
VLF ENVELOPE TIMING EXPERIMENT.
Final engineering rept.
Oct 65, 307p. Rept. no. TD-65-387,
Contract NObsr-89358, Proj. SS294001, Task 9210,
Unclassified report

See also AD-435 781, AD-601 349.

Descriptors: (*Time signals, Synchronization (Electronics)), (*Timing devices, *Very low frequency), Timing circuits, Time, Rubidium, Pulse communication systems, Pulse transmitters, Pulse generators

Experimental equipment was developed which measures the arrival time of a pulsed VLF radio wave to high resolution. An experiment was performed wherein the NBA (naval radio station)-generated VLF signal envelope was measured at Richmond, Florida, Washington, D. C. and Nutley, New Jersey, in order to transfer time from NBA to the experimental location. A rubidium frequency standard was flown successfully between the data gathering sites and NBA to correlate the time determined by the experiment with time as transmitted by NBA. The results achieved were best for the Nutley site where the total scatter of time determinations for the final week of the experiment was contained within limiting values of -50 to + or -150 microseconds with respect to time as obtained by the transport. Results achieved at Washington and Richmond showed more scatter and additionally an apparent offset from the predicted values which might be caused by improper propagation delay assumptions or calculations. Analysis of 1000 single time determinations which are averaged to produce each time measurement indicate normal distribution patterns with a probable error of the average in the 10 to 15 microsecond area. This short term equipment resolution is encouraging since it implies random signal perturbation by noise and justifies the system technique for short term measurement. (Author)

AD-630 636 Fld. 17/2, 4/2
CFSTI Prices: HC $3.00 MF $0.75
ELECTRONIC SYSTEMS DIV L G HANSCOM FIELD MASS DECISION SCIENCES LAB
A STUDY IN INFORMATION PROCESSING: ELECTROLUMINESCENT VS TELETYPE READABILITY OF WEATHER MESSAGES,
by Alan M. Kershner, and Donald L. Avery. Dec 65, 75p. Proj. AF-7682, Task 768201,
ESD TR-66-149
Unclassified report

Descriptors: (*Weather communications, Display systems), (*Display systems, Human engineering), Electroluminescence, Teletype systems, Reading, Errors, Time, Visibility

An investigation was undertaken to provide a human factors evaluation of an electroluminescent display designed for the presentation of around-the-base weather messages. Time and error data were obtained for 42 Air Force weather, GCA, and pilot personnel in responding to six questions for each of 50 weather messages, 25 of which were presented on an electroluminescent display and 25 by conventional teletype format. The few significant differences found do not warrant a conclusion that the electrolumescent format employed is inferior to the conventional teletype format. It is conclusded that weather message information processing may be improved by the development of time and error normative data for a standard set of weather messages, thereby permitting the identification of high-error (perhaps error-prone) personnel, by training to improve the interpretation of visibility coding and more specifically, by an improved formating of fractions concerned with visibility. The suggestion for the development of normative data may have applicability for other military information systems. (Author)

AD-630 659 Fld. 17/2, 5/9
CFSTI Prices: HC $3.00 MF $0.75
SYSTEMS RESEARCH LABS INC DAYTON OHIO
TEST AND EVALUATION OF ELECTRONIC IMAGE GENERATION AND PROJECTION DEVICES. VOLUME III - EVALUATION OF PROJECTION SCREENS.
Final rept. Jul 64-Jul 65,
by John H. Harshbarger, and James D. Basinger.
Dec 65, 68p. Contract AF 33 (615)-1889, Proj. AF-6114, Task 611405,
AMRL TR-65-116-vol 3
Unclassified report

See also AD-628 693.

Descriptors: (*Television display systems, Flight simulators), (*Training devices, Astronautics), (*Cathode ray tube screens, Effectiveness), Cathode ray tubes, Surface properties, Brightness, Visual perception, Colors, Television equipment

The report presents data from an evaluation of seven types of projection screen surfaces to deter-

mine which surface best meets the requirements of visual simulation for astronautical flight training. In order to evaluate the various screen surfaces in terms of their brightness and the angle through which incident light is reflected, methods of measurement were devised which compared each screen to a given reference surface. Two materials were tried as the reference surface, the traditional matte white surface of magnesium carbonate and a special type of white paint applied to masonite. The latter surface reflected the more uniform pattern of light, but proved difficult to duplicate due to the great care needed to apply the paint evenly. Thus the report recommends continued use of magnesium carbonate block as the standard reference for display screen measurements. The test data on the seven screen surfaces indicates a wide variation in display characteristics. Apparently the user must accept an appropriate compromise between brightness and viewing angle -- the more confined the viewing angle the brighter the display. It was also noted that flaws in the screen surface are particularly apparent in the more directive, brighter screen materials. It is thus essential that screens employing such materials be manufactured with extreme care. (Author)

AD-630 687 Fld. 17/2, 17/5
CFSTI Prices: HC $1.00 MF $0.50
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C
A NEW CAMERA TUBE, THE INFRACON,
by N. L. Artem'yev, and V. N. Kornilov. Apr 66, 5p. Contract DA-44-009-AMC-1563 (T), Proj. 1P01450-1A31B
AERDL T-1829-66

Unclassified report

Trans. of Radiotekhnika i Elektronika Moscow, v10 n10 1965.

Descriptors: (*Camera tubes, *Infrared image tubes), Television equipment, Television communication systems, USSR

A camera tube, the infracon, with a cooled phototarget for work in the 0.65 to 40-micron spectral region was investigated. A monocrystalline semiconductor material, working on the accumulation principle, was used as a photo-target. The phototarget turned out to be effective for the transmission of a television image in 0.65 to 4 0 micron spectral region. When the tube was tested, parameters were obtained which testify to the possibility of obtaining television images of objects heated to a temperature of 125C and higher. The threshold strength of irradiation at this temperature is approx. 0.1 microwatts/sq mm. The received image is practically inertialess. (Author)

AD-630 711 Fld. 17/2, 9/1
CFSTI Prices: HC $3.00 MF $0.75
ITT INDUSTRIAL LABS FORT WAYNE IND
RESEARCH INVESTIGATIONS ON SMOOTHING ELECTRON MULTIPLIER FOR ELECTRONIC-SCANNED IMAGE TUBE.
Final rept., 7 Jan 64-7 Feb 65,
by James L. Gumnick, and R. A. Harber. 5 Feb 65, 67p. Rept. no. S-3312,
Contract N123 (62738)35257A (X),

Unclassified report

See also AD-614 786.

Descriptors: (*Electron multipliers, *Image tubes), Image orthicons, Iconoscopes, Detection, Signal-to-noise ratio, Phosphorescent materials, Photocathodes, Secondary emission, Pulse generators, Sandwich construction

The object is to improve the signal-to-noise ratio obtainable in an image dissector type camera tube. The desired performance specifications are given below as a direct excerpt from the proposal request. The smoothing principle has been demonstrated experimentally and good agreement between the theoretical analysis and experiment has been found. The smoothing feature has been demonstrated using a phosphor-photocathode smoothing element. Both periodic and random electron pulses have been applied to the phosphor-photocathode sandwich. This was done by feeding periodic voltage pulses from a conventional electronic pulse generator or random pulses generated in a multiplier phototube to the grid of a CRT containing the phosphor element of the sandwich. Photographs of the scope display showing the output improvements of the phosphor-photocathode smoothing sandwich were made. Extensive measurements of the noise voltage preceding and following the smoothing device were also made in order to compare theory and experiments. The agreement of these experimental results with theory are felt to be very good.

AD-630 777 Fld. 17/2, 17/4, 9/4
CFSTI Prices: HC $3.60 MF $0.50
NAVY ELECTRONICS LAB SAN DIEGO CALIF
THE ELECTRONIC WARFARE GRAPHIC INTERCOM SYSTEM.
Research and development rept. Jun 63-Jun 65, by R. W. Jones. 4 Jan 66, 31p. Rept. no. NEL-1348,
Proj. SS-316-001, Task 9275/11294 (NEL-G20551)

Unclassified report

Descriptors: (*Electromagnetic warfare, Intercommunication systems), (*Intercommunication systems, Display systems), Naval operations, Ships, Communication systems, Visual signals, Command + control systems, Combat information centers, Information theory, Graphics

Inefficient operation of message transmission by audio means caused the development of a graphic communication system for electronic warfare. Tests demonstrated that information can be presented continuously and reliably to a remote observer by the graphic intercom system with efficient control. (Author)

AD-630 905 Fld. 17/2, 9/1, 9/3
CFSTI Prices: HC $4.00 MF $1.00
ITT INDUSTRIAL LABS FORT WAYNE IND
UNIQUE SCAN CLOSED-LOOP TELEVISION SYSTEM.
Final rept. Jun 64-Jun 65,
by Robert V. Quinlan, and John A. Holmquist. Dec 65, 124p. Contract AF 33 (615)-1906, Proj. AF-6114, Task 611405,
AMRL TR-65-215

Unclassified report

Descriptors: (*Television cameras, *Scanning), (*Cathode ray tubes, *Electron optics), Television display systems, Vidicons

In the Phase I portion of this effort, a study of display components and techniques was undertaken to determine a feasible method of implementing a closed-loop television system which does not have the objectionable line structure and false reference cues of a conventional raster scan TV system. The result of this study was the recommendation to design and fabricate a closed-loop television system employing conventional raster scan and additional vertical deflection signals to break up the line structure and produce a more nearly flat field. The additional deflection signals were to be sine waves of frequencies (1) in the range of 100 to 500 kilocycles and (2) approximately 20 megacycles. Phase II of this effort describes the design and evaluation of the recommended system. The basic pickup device employed is an electrostatic vidicon operating in a hybrid mode and the display device is a dual deflection cathode ray tube (CRT). The raster scan is generated by means of the magnetic deflection components and the additional vertical deflection is applied to electrostatic deflection plates. The primary display parameters are 945 lines, 30 frames per second, two-to-one interlace; however, provision is made for operation at 525 lines, 60 frames per second, two-to-one interlace. High frequency deflection was found to be the most effective means of reducing line structure. Low frequency sine wave deflection aids breakup of line structure but, in some cases, introduces objectionable effects such as moire' patterns and flicker. (Author)

AD-630 941 Fld. 17/2, 5/9
CFSTI Prices: HC $1.00 MF $0.50
SYSTEMS RESEARCH LABS INC DAYTON OHIO
DEVELOPMENT OF A HIGH RESOLUTION RESEARCH TELEVISION SYSTEM.
Final rept. Jul-Sep 65,
by John H. Harshbarger. Dec 65, 27p. Contract AF 33 (615)-3144, Proj. 6114, Task 611405,
AMRL TR-65-235

Unclassified report

Descriptors: (*Television display systems, Flight simulators), Television cameras, Television equipment, Display systems, Pulse generators, Simulation, Training devices, Astronautics

As a basis for the evaluation of high resolution television displays for their possible application to visual simulation training technique, a high resolution television system was developed to provide high quality signals which will drive the display devices which were to be evaluated. As a result of previous research, a 1029 - scanning line television system had been developed. Limitations in this single camera arrangement restricted the research which could be conducted into high resolution devices. A larger, higher quality system was required to carry the research study to greater levels of performance with less effort lost due to maintenance and adjustment. The system constructed combines newly-purchased devices modified as required for the application together with some specially developed items and other government furnished equipment which was modified and integrated into the system. The design approach which led to the particular system concept employed is explained also. The equipment itself is described in detail with schematics and interconnection diagrams provided for special pieces of equipment. The effort is considered successful, as documented by photographs of displays achieved through the system. (Author)

AD-631 168 Fld. 17/2, 20/5
LINCOLN LAB MASS INST OF TECH LEXINGTON
SEMICONDUCTOR LASER COMMUNICATIONS THROUGH MULTIPLE-SCATTER PATHS,
by E. J. Chatterton. 4 Oct 65, 2p. Rept. no. JA-2664,
Contract AF 19 (628)-5167,
ESD TDR-66-150

Unclassified report

Availability: Published in Proceedings of the IEEE v53 n12 p2114-5 Dec 1965. Copies to DDC users only.

Descriptors: (*Light communication systems, *Lasers), Light transmission, Scattering, Aerosols, Atmospheric motion, Modulation, Fiber optics, Semiconductor devices

The report relates to limitations on range and reliability of wide-band laser communications caused by atmospheric turbulence and multiple-scattering aerosols. (Author)

AD-630 560 See Fld. 9/4

AD-630 690 See Fld. 9/1

AD-631 048 See Fld. 4/1

17/2.1 RADIO COMMUNICATIONS

AD-630 562 Fld. 17/2.1, 9/4
CFSTI Prices: HC $11.60 MF $0.75
ELECTRO TECHNICAL ANALYSIS CORP TUCSON ARIZ

FREQUENCY ASSIGNMENT STUDIES.
Quarterly progress rept. no. 2, 1 Nov 65-31 Jan 66,
by A. J. Hochn, and T. W. McCurnin. Mar 66, 116p. Contract DA-28-043-AMC-01232 (E), Proj. DA-1E6-20501-D44901, ECOM 01232-2

Unclassified report

See also AD-625 585.

Descriptors: (*Electromagnetic compatibility, Radio communication systems), (*Radio communication systems, Tactical warfare), (*Radiofrequency, Scheduling), Frequency, Military requirements, Information theory, Radio transmission, Networks, Nonlinear systems, Mixers (Electronic), Radiofrequency interference, Reduction, Graphics

This is a study to improve electromagnetic compatibility in the field army through development of frequency assignment practices. Theoretical problems inherent in efficiently apply mutually interference-free frequency groups to radio networks are analyzed. The problems are formulated in a mathematical structure and methods of solution are presented. Both are shown to be analogous to those encountered in replication of radio -frequency assignment. A simple graphical aid is developed to determine far-site exclusions bounding frequency assignment. The aid is applied directly to the map overlay of a network and greatly facilitates determination of the exclusion data required. Assignment grid-overlay methods are analyzed and problems isolated. Design procedures for grid-overlay methods are formulated and used to develop representative systems. A tentative comparison of the efficiency of grid-overlay systems and more direct application of class-theory expressions is considered. Radio-net operation is analyzed with both on-site and far-site problems considered. The basic complexity of exact analysis is demonstrated, and the need for a synthesis approach shown. (Author)

AD-630 702 Fld. 17/2.1, 9/3, 14/2
CFSTI Prices: HC $3.00 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
LINCOLN EXPERIMENTAL TERMINAL ANTENNA SYSTEM.
Technical rept.,
by Bernard F. LaPage. 4 Oct 65, 57p. Rept. no. TR-404,
Contract AF 19 (628)-5167, Proj. AF-649L
ESD TDR-65-458

Unclassified report

Descriptors: (*Parabolic antennas, *Space communication systems), (*Test equipment (Electronics), Antennas), Antenna radiation patterns, Conical antennas, Horn antennas, Antenna apertures, Antenna arrays, Antenna feeds, Mobile, Radio equipment

The Lincoln Experimental Terminal (LET) is a small transportable ground terminal for testing and evaluating space communications techniques. The requirements, design analysis, and performance data for the LET antenna and feed system are described. The 15-foot -aperture antenna has Cassegrainian optics, and a conical-horn-reflector feed exciter producing opposite-hand circularly polarized transmitting and receiving beams. The simultaneous operation of a two-channel tracking system is also discussed. (Author)

AD-630 812 Fld. 17/2.1, 9/3
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV OF RADIO AND ELECTRICAL ENGINEERING
BULLETIN OF THE RADIO AND ELECTRICAL ENGINEERING DIVISION.
Vol. 15, No. 4.
1965, 55p.

Unclassified report

Availability: Published in Bulletin of the Radio and Electrical Engineering Division National Research Council of Canada v15 n4 p1-49 Oct-Dec 965. Copies to DDC users only.

Descriptors: (*Radio communication systems, Periodicals), (*Electrical engineering, Periodicals), Canada, Electrical corona, Low-temperature research, Comparators, Alternating current, Interferometers, Radio astronomy, Telescopes, Astrophysics, Attenuation, Micrometeorology, Punched tape, Aluminates, Silicates, Vacuum, Spectrum analyzers, Surface properties, Navigational aids, Hail, Storms, Radar equipment

Contents: Laboratory study of corona at subfreezing temperatures, by M. M. Khalifa, R. M. Morris; Self-balancing A-C current comparator, by O. Petersons; Assembly of multi-element interferometer, by T. H. Legg, M. F. Bell; Control system for 150-foot radio telescope, by W. A. Cumming; Atmospheric attenuation at 3 Gc/s, by W. J. Medd; Micrometeoroid detector with an acoustically isolated sensing surface, by R. Wlochowicz; Punched paper-tape system for rocket telemetry data, by M. Ito; Large Aluminosilicate ultrahigh-vacuum system, by J. P. Hobson, J. W. Earnshaw; Monopole mass spectrometer; Surface physics; Quantum electronics; Aids to navigation (tacan antennas and photoelectric tracking of model ships); Radar for study of hailstorms.

AD-630 989 Fld. 17/2.1, 14/2
CFSTI Prices: HC $2.00 MF $0.50
NAVY ELECTRONICS LAB SAN DIEGO CALIF
SHIPBOARD INTERFERENCE SIMULATOR.
Research and development rept. Jan-Dec 64,
by W. M. Chase, and T. L. Whalen. 12 Jan 66, 26p. Rept. no. NEL-1351,
Proj. SS-296-0014, Task 11034 (NEL-J51061),

Unclassified report

Descriptors: (*Interference, Simulation), (*Communication systems, Shipborne), (*Crystal oscillators, Interference analyzers), Analog computers, Transmitter -receivers, Electronic equipment, Noise (Radio)

A shipboard interference simulator was designed which accurately reproduces the potential frequencies of interference derived from the intermodulation between any combination of simultaneous transmitter fundamental frequencies up to a total of 10. The relationship of interference-signal magnitudes is in reasonable agreement with similar signals actually measured aboard ship. The simulator proved its worth as an aid in demonstrations of intermodulation interference before Naval personnel concerned with shipboard communications problems. The simulator represents an analog computer with which detailed knowledge of intermodulation pehnomena can be increased. It is especially valuable when more than the classic two fundamental signals are on together. (Author)

AD-631 084 Fld. 17/2.1, 9/5
CFSTI Prices: HC $9.60 MF $0.75
SIMMONDS PRECISION PRODUCTS INC TARRYTOWN N Y
AN/PRC-65 RADIO SET.
Technical rept. (Interim),
by Edward M. Ulicki. Mar 66, 99p. Rept. no. PD-5536,
Contract AF 30 (602)-3445, Proj. AF-5592,
Task 559201,
RADC TR-65-211

Unclassified report

Descriptors: (*Transmitter-Receivers, Very high frequency), Portable, Microminiaturization, Reliability (Electronics), Band-pass filters, Integrated circuits, Films, Broadband, Radiofrequency amplifiers, Power amplifiers, Single crystals, Crystal filters, Transistors

The task was to design and develop an ultra-miniature, high-reliability radio set, having over 1000 channels operating in the VHF frequency range of 100 to 156mc. This radio set is to operate from a single crystal source, transmit in the given frequency range in 50kc steps, and have the capability of changing frequencies by means of a single digital switch. The radio set uses many new innovations and techniques, some of which are: a broadband transceiver which is untuned except for a bandpass filter; a digital frequency synthesizer to obtain the large number of channels from a single frequency source; and integrated and thin-film circuits for obtaining high packaging volume and high reliability. Extensive development work was expended on designing the broadband RF power amplifier and its associated modulator. These circuits have proven to be very successful and can be adapted for extension in the UHF frequency range of 225 to 400 mc. (Author)

AD-630 656 **See Fld. 17/7**

AD-630 872 **See Fld. 9/5**

AD-630 873 **See Fld. 9/5**

AD-630 895 **See Fld. 20/14**

17/3. DIRECTION FINDING

AD-631 152 **See Fld. 17/7**

17/4. ELECTROMAGNETIC AND ACOUSTIC COUNTERMEASURES

AD-630 777 **See Fld. 17/2**

17/5. INFRARED AND ULTRAVIOLET DETECTION

AD-630 687 **See Fld. 17/2**

17/7. NAVIGATION AND GUIDANCE

AD-630 656 Fld. 17/7, 17/2.1
CFSTI Prices: HC $4.60 MF $0.50
NAVAL RESEARCH LAB WASHINGTON D C
SUMMARY OF THE FLIGHT PERFORMANCE OF THE NRL MARK I AND MARK II OMEGA AIRCRAFT RECEIVERS.
Memorandum rept.,
by E. L. Kline, A. F. Thornhill, and M. F. Williams. 23 Feb 66, 45p. Rept. no. NRL-MR-1683,
Proj. SS-161-001-6161,

Unclassified report

Descriptors: (*Radio receivers, Airborne), (*Radio navigation, Performance (Engineering)), Flight testing, Feasibility studies, Aircraft, Very low frequency, Hyperbolic navigation, Velocity

Omega is a very-low-frequency radio navigation system which is characterized by very-long-range capability and relatively high accuracy. The performance study results indicate that the use of the Omega navigation system for aircraft is entirely practical. The use of automatic velocity-aiding and automatic dead reckoning in the Mark II receiver resulted in considerable improvement over the operation of the Mark I. The velocity -aiding inputs from the true air speed and heading instruments of the aircraft enable the receiver servo to restrict operation to the narrow bandwidth necessary to correct the velocity-aiding inputs and to automatically dead reckon in high noise conditions. The Mark II operates on either hyperbolic or circular coordinates. The repeatability of 35 fixes during five evaluation flights over a period of one month

217-041 O-66—5

was 14 fixes within one-half mile, 20 fixes within one mile and one fix slightly less than two miles. In strong signal areas, i.e., the Carribean (Hawaii--3 kilowatts (kw) radiated, 4300 nm range; Criggion, Wales--a temporary station, 0.4 kw radiated, 3600 nm range; and Forestport--0.2 kw radiated, 1300 nm range) navigation is continuous and precise. (Author)

AD-630 779 Fld. 17/7, 1/2
CFSTI Prices: HC $1.00 MF $0.50
NATIONAL AVIATION FACILITIES EXPERIMENTAL CENTER ATLANTIC CITY N J EXPERIMENTATION DIV
EXAMINATION OF SST HANDLING IN THE ATC SYSTEM,
by Donald S. Schlots. 1964, 13p.
Unclassified report

Presented at the RTCA Annual Assembly Meeting 1964, Washington, D. C., 30 Sep 64.

Descriptors: (*Air traffic control systems, *Supersonic planes), Transport planes, Simulation

Activities of the Federal Aviation Agency are related that investigate the problems of air traffic control that will be evidenced by the introduction of supersonic transports. The program calls for investigative concept studies for handling Mach 3 civil transports, military aircraft, and supersonic transport planes of the Concorde family. A simulated area was set up at the Center that covered routes of 450 miles from northern Virginia to a point near Bangor, Maine. From the simulation tests, the conclusion was reached that the more preferential treatment that is given to these transports, the lower the overall airport operations rate will be; also, excessive delays will be incurred by subsonic aircraft, both en route and on the ground.

AD-630 786 Fld. 17/7
CFSTI Prices: HC $2.00 MF $0.50
WISCONSIN UNIV MADISON GEOPHYSICAL AND POLAR RESEARCH CENTER
AN EXPERIMENT IN ARCTIC VLF NAVIGATION.
Research rept. series (Final rept.),
by Karl R. Redell. Nov 65, 28p. Rept. no. RR-65-2,
Unclassified report

Descriptors: (*Radio navigation, *Arctic regions), (*Very low frequency, Radio navigation), Weather stations, Ice islands, Greenland Sea, Position finding, Navigation, Phase measurement

The passage of ice island ARLIS II into the East Greenland Sea early in 1965 and the resulting higher drift rate made necessary a more continuous type of navigation than was possible with celestial navigation. An experimental VLF system was available which could theoretically provide navigational accuracies of plus or minus 2 miles. Three VLF stations (GBR, NSS, and NPG) were received on the island. The VLF phase tracking data was in error, however, due to defective preset counters in the frequency synthesizers. Operational problems and potentials of the system in Arctic use are discussed. (Author)

AD-630 900 Fld. 17/7, 9/3
CFSTI Prices: HC $7.00 MF $1.75
PICKARD AND BURNS ELECTRONICS WALTHAM MASS
OMEGA, A WORLD-WIDE NAVIGATIONAL SYSTEM.
Revised ed. no. 2,
by R. H. Woodward, J. A. Pierce, W. Palmer, and A. D. Watt. 1 May 66, 364p. Rept. no. P/B Pub. no. 886B,
Contract Nonr-4105 (00),Nonr-1866 (07) Proj. P/B-347,
AD 603 764 SUPERSEDED
Unclassified report

Prepared in cooperation with Sperry Gyroscope, Great Neck, N. Y. and Deco Electronics, Cambridge, Mass., Contracts Nonr-4173 (00) and Nonr-4107 (00).

Descriptors: (*Radio navigation, *Global communication systems), (*Hyperbolic navigation, Global communication systems), Very low frequency, Radio signals, Propagation, Radio transmitters, Systems engineering, Synchronization (Electronics), Radio receivers, Analog systems, Digital systems, Navigation charts, Position finding

This report presents a design plan for a radio-locating facility providing world-wide position fixing of moderate (one-mile) accuracy by phase comparison of VLF (10 - 14 kc) continuous wave radio signals from only eight strategically located transmitting stations usable by aircraft, ships, and land vehicles, and by submarines at moderate (40 - 50 feet) antenna depths.

AD-631 008 Fld. 17/7, 8/2
CFSTI Prices: HC $2.60 MF $0.50
NAVY ELECTRONICS LAB SAN DIEGO CALIF
OMEGA IN THE ATLANTIC (1963-1965): IN-PORT MEASUREMENTS FROM HMS VIDAL AND HR. MS. SNELLIUS ON OCEANOGRAPHIC SURVEY NAVADO.
Research and development rept., Oct 63-Dec 65,
by E. R. Swanson, and W. E. Davis. 10 Jan 66, 30p. Rept. no. NEL-1350,
Proj. SS-161-001, Task 6101,
Unclassified report

Descriptors: (*Radio navigation, *Hydrographic surveying), (*Oceanographic vessels, Radio navigation), Atlantic Ocean, Very low frequency, Radio waves, Propagation, Phase measurement, Position finding, Navigational aids

Measurements were made of 10.2-kc/s phase difference in 24 ports of call in the Atlantic area. The measurements are generally well explained by present propagation models which indicate that an implemented Omega system will have an accuracy of about 0.9 n. mi. (c. e. p.) over the 24-hour day. (Author)

AD-631 024 Fld. 17/7
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
SATELLITE DOPPLER NAVIGATION FOR SMALL CRAFT.
Technical memo.,
by W. H. Guier. Aug 65, 68p. Rept. no. TG-719,
Contract NOw-62-0604-c,
Unclassified report

Descriptors: (*Doppler navigation, *Navigation satellites), Mathematical analysis, Radio signals, Doppler effect, Tables

The paper presents a method for obtaining a navigation fix that is suitable for small craft which uses measurements of the satellite radio Doppler shift and published tables. The method utilizes integral doppler data taken in the same manner as the AN/SRN-9 equipment but changes the times at which the doppler count triggers are transmitted from the satellite. The solution tables to determine the navigator's position relative to the satellite are new. The form of the solution tables are factored such that accurate time and frequency standards on board the navigating craft are not needed. The accuracy of the navigation fix is essentially the same as the AN/SRM-9 equipment if the navigatior is willing to hand compute several fine corrections. The navigation fix with no corrections should be accurate to about one or two nautical miles. (Author)

AD-631 152 Fld. 17/7, 17/3
CFSTI Prices: HC $1.60 MF $0.50
NAVAL AIR DEVELOPMENT CENTER JOHNSVILLE PA AERO MECHANICS DEPT
ASSISTANCE IN DEVELOPMENT AND EVALUATION OF BEARING, DISTANCE AND HEADING INDICATOR (BDHI) INSTRUMENTATION.
Phase rept.,
by J. L. Leavens. 4 Apr 66, 19p. Rept. no. NADC-AM-6610,
Unclassified report

Descriptors: (*Naval aircraft, Instrumentation), (*Distance-measuring equipment, Naval aircraft), (*Direction finding, Naval equipment), Synchros, Specifications, Navigational aids, Torque, Homing devices

CONCLUSIONS: BDHI instrumentation in current aircraft cannot perform to one-degree accuracy. Large errors occur during change of heading of the aircraft, and an indication lag of from four to eight degrees is common. Specifications for the equipments which are the source of signal inputs for the BDHI are wholly inadequate in defining the synchros that are to be used in the system. The BDHI specification, MIL-1-22075, does not require that the indicator be tested using the inputs that are the same as those to which it would be connected in an aircraft. Consequently indicators can pass all the requirements of the specification and still not perform satisfactorily when installed in an aircraft. If torque receiver synchros are to be used in the BDHI, then the systems which drive the BDHI must contain torque transmitter synchros. With the proper type of torque synchros installed, a satisfactory BDHI instrumentation system can be had without requiring the indicator pointers to be servo driven. (Author)

AD-630 839 **See Fld. 8/8**

17/8. OPTICAL DETECTION

AD-631 188 **See Fld. 9/1**

17/9. RADAR DETECTION

AD-630 556 Fld. 17/9, 20/13
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
SOME PROBLEMS OF RADAR TRACKING OF MULTIPLE TARGETS.
Research translation,
by A. G. Gorelik, and A. A. Chernikov. Jan 66, 20p. Rept. no. T-R-518,
Contract AF 19 (628)-3880,
TT 66-60838
Unclassified report

Nekotorye Voprosy Radiolokatsii Mnozhestvennoi Tseli, trans. of Tsentralnaya Aerologicheskaya Observatoriya. Trudy (USSR) n57 p77-86 1964.

Descriptors: (*Radar tracking, Multiple operation), USSR, Radar targets, Radar, Coherent radar, Statistical functions, Radar reflections, Scattering, Wave transmission, Antenna radiation patterns, Field theory

In the paper, relationships are obtained for the power, correlation function, and spectrum of an echo from an aggregate of scatterers, as applied to the problem of investigating the dynamics of the atmosphere, using conventional and pulse-coherent radars. (Author)

AD-630 674 Fld. 17/9, 4/2, 9/5
CFSTI Prices: HC $1.00 MF $0.50
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS
THE USE OF AN INTEGRATOR TO INCREASE THE METEOROLOGICAL EFFICIENCY OF A RADAR.

Research translation,
by K. S. Zhupakhin. Jan 66, 16p. Rept. no. T-R-529,
Contract AF 19 (628)-3880,
TT 66-60908

Unclassified report

Primenenie Nakopitelia Dlia Uvelicheniya Meteorologicheskoi Effektivnosti Radiolokatsionnoi Apparatury, trans. of Glavnaya Geofizicheskaya Observatoriya, Leningrad. Trudy (USSR) n173 p63-70 1965.

Descriptors: (*Meteorological radar, *Integrators), Meteorological parameters, Radar scanning, USSR

This paper describes the results of work with an integrator designed at the Central Aerological Observatory, USSR, to increase the sensitivity of the receiver of a weather radar. It is shown that the use of this device raises the meteorological efficiency of the radar. (Author)

AD-630 819 Fld. 17/9, 9/3
CFSTI Prices: HC $2.00 MF $0.50
BUREAU OF SHIPS WASHINGTON D C
PERFORMANCE CHARACTERISTICS OF RADAR PHASED ARRAYS,
by R. T. Hill. 1965, 29p.

Unclassified report

Presented at Association of Senior Engineers Annual Technical Symposium (3rd).

Descriptors: (*Radar antennas, *Phased arrays), Parabolic antennas, Antenna arrays, Antenna radiation patterns, Graphics, Performance (Engineering)

The performance of Radar Antennas of a conventional rotating type can be specified and interpreted with relative ease. The performance of fixed antennas (phased arrays) can be described only by families of multivariate functions, which lead themselves to statistical rather than deterministic analysis. The nature of these functions, including an examination of some transient effects, is illustrated in pictorial ways (3-dimensional graphs), and some new performance concepts are defined. Not only is the distinct change in performance interpretation urgent for the microwave engineer and system specifier, it is also important that those concerned in less direct ways with Navy radar operation have an appreciation of these properties. (Author)

AD-630 966 Fld. 17/9, 9/3
SHAPE TECHNICAL CENTER THE HAGUE (NETHERLANDS)
STUDIES OF LOGARITHMIC RADAR RECEIVER USING PULSE-LENGTH DISCRIMINATION,
by Vilhelm Gregers Hansen. 18 Feb 65, 8p.

Unclassified report

Availability: Published in IEEE Transactions on Aerospace and Electronic Systems vAES-1 n3 p246-53 Dec 1965. Copies to DDC users only.

Descriptors: (*Logarithmic amplifiers, *Radar receivers), Radar clutter, Reduction, High-pass filters, Pulse discriminators, Detection

Using a logarithmic amplifier giving a detected output followed by a high-pass filter is a technique for reducing adverse effects of distributed clutter in radar receivers. A pulse-length discriminator (PLD) used as the high-pass filter is treated here. Theoretical and experimental results for the loss in detectability introduced by this receiver, as compared with a matched filter or a good approximation thereto, have been obtained. For the case of single-hit detection, losses of 4 to 8 dB are introduced by the logarithmic amplifier/pulse-length discriminator (LOG AMP/PLD) combination; for post-detection integration, the losses are reduced to 2 to 4 dB. The latter values would apply where the LOG AMP/PLD output is presented on a PPI (plan position indicator). Some experimental results of the ability of the LOG AMP/PLD receiver to reject signals of incorrect pulse length show that signlas exceeding the design pulse length by more than 25 to 50 percent are effectively suppressed. No significant short-pulse discrimination is obtained from the receiver. (Author)

AD-631 106 Fld. 17/9, 9/5, 9/2
CFSTI Prices: HC $5.00 MF $1.00
LINCOLN LAB MASS INST OF TECH LEXINGTON
HAYSTACK POINTING SYSTEM: CONTROL STRUCTURE.
Technical note,
by John D. Drinan, and Arthur A. Mathiasen. 9 Mar 66, 156p. Rept. no. TN-1966-10,
Contract AF 19 (628)-5167, Proj. AF-649L
ESD TDR-66-154

Unclassified report

See also AD-622 666, AD-629 936, AD-630 193.

Descriptors: (*Radar antennas, Steering), (*Radio telescopes, Steering), Programming (Computers), Space surveillance systems, Magnetic tape, Real time, Man-machine systems, Control systems, Radio astronomy, Input-output devices, Satellite tracking systems

The Haystack Pointing System, implemented on the Univac 490 computer, is comprised of some thirty odd subprograms which go to make up an operating system and a utility system. The domain of this memorandum is limited to the description of the control of the operating system as vested in the master control and timing programs and in the computer itself via its external and internal interrupt capabilities. In the discussion of the programmed control function are included the real-time and simulation modes of the system, the man-machine communication scheme, the experiment set-up procedures, a step by step description of the entire system cycle, the plug-in program concept as utilized in connection with the celestial computation programs and data processing programs as well as other system facets as they relate to control. Certain procedural matters which bear on the control structure are discussed. (Author)

AD-631 180 Fld. 17/9, 9/5, 20/12
CFSTI Prices: HC $3.00 MF $0.75
GENERAL ELECTRIC CO SYRACUSE N Y HEAVY MILITARY ELECTRONICS DEPT
MIRAGE (MICROELECTRONIC RADAR INDICATOR FOR GROUND EQUIPMENT).
Final technical rept., 6 Dec 64-30 Jun 65,
by William E. Wickes, E. T. Combes, D. W. Perkins, and J. W. Boortz. Mar 66, 65p. Rept. no. TIS-R65EMH22,
Contract AF 30 (602)-3572, Proj. ADO-677A
RADC TR-65-335-Vol-1

Unclassified report

Descriptors: (*Plan position indicators, *Microminiaturization (Electronics)), (*Radar equipment, Microminiaturization (Electronics)), (*Integrated circuits, Plan position indicators), Digital systems, Silicon, Printed circuits, Computer logic, Solid state physics, Cathode ray tubes, Display systems

MIRAGE is the first attempt to eliminate the electromechanical devices such as resolvers, synchros, gear trains and electric motors inherent to PPI displays by the use of digital silicon integrated circuit techniques. By the use of digital techniques a 10-inch PPI display was developed that weighs 63 pounds, has a volume of 2.2 cubic feet and consumes 85% watts of power. All the circuits in this PPI are transistorized (except the CRT itself) and actually 98% of the circuits are of the silicon integrated type. The circuits that are still conventional transistorized were designed to be easily integratable at a later date. (Author)

AD-630 553 **See Fld. 4/2**

AD-630 554 **See Fld. 4/2**

AD-630 670 **See Fld. 4/2**

AD-630 673 **See Fld. 4/2**

AD-630 675 **See Fld. 4/2**

AD-630 676 **See Fld. 4/2**

AD-630 864 **See Fld. 20/3**

AD-630 918 **See Fld. 5/1**

17/10. SEISMIC DETECTION

AD-630 559 Fld. 17/10, 8/11
CFSTI Prices: HC $3.00 MF $0.75
LINCOLN LAB MASS INST OF TECH LEXINGTON
SEISMIC DISCRIMINATION.
Semiannual technical summary rept. 1 Jul-31 Dec 65,
by Paul E. Green Jr., 31 Dec 65, 58p. Contract AF 19 (628)-5167 ,ARPA Order-$12
ESD TDR-65-597

Unclassified report

Descriptors: (*Seismology, *Detection), (*Seismometers, Montana), Seismological stations, Instrumentation, Earthquakes, Nuclear explosions, Identification systems

The experimental Large Aperture Seismic Array (LASA) in Montana was put into operation and has been used for routine monitoring and data recording. Most of the physical elements of the system are working more reliably than had been anticipated. Research and experimentation with various array processing techniques are under way using LASA data. Results on automatic event detection and location are discussed. Both these sets of investigations are approaching the point at which the LASA capabilities can be established, the signal processing hardware design can be finalized, and a design of a possible global network of LASA's can be worked out, should it be needed. The large array is a signal improvement system whose outputs are to be used for nuclear test monitoring and research on the solid earth. Early results are reported. Two miscellaneous studies of seismic instrumentation are reported: a survey of electromagnetic means of measuring long-baseline earth strains, and a comparative critique of the noise performance of several methods of amplifying near DC signals. A cumulative list of publications in this program is also presented. (Author)

AD-631 043 Fld. 17/10, 8/11
CFSTI Prices: HC $2.00 MF $0.50
TELEDYNE INDUSTRIES INC ALEXANDRIA VA EARTH SCIENCES DIV
LONG RANGE SEISMIC MEASUREMENTS. CHARCOAL.
Scientific rept.,
by Don M. Clark. 25 Feb 66, 30p. Rept. no. Seismic Data- Lab-138,
Contract AF 33 (657)-15919,ARPA Order-624
Proj. VELA-T/6702,

Unclassified report

Descriptors: (*Seismology, *Nuclear explosions), (*Detection, Nuclear explosions), Underground explosions, Earthquakes, Identification systems, Test facilities, Nevada

An analysis of seismological data from an underground nuclear explosion as a continuing study to provide information to aid in distinguishing between earthquakes and explosions. A table of travel-times and amplitudes of P, Pg, Lg, and surface waves are included along with other unidentified phases. (Author)

AD-631 052 Fld. 17/10, 8/11
CFSTI Prices: HC $2.00 MF $0.50
UED EARTH SCIENCES DIV TELEDYNE INC ALEXANDRIA VA

LONG RANGE SEISMIC MEASUREMENTS. CHASE IV,
by Don M. Clark. 16 Sep 65, 28p. Rept. no. Seismic Data Lab-137,
Contract AF 33 (657)-12447,ARPA Order-624
Proj. VELA-T/2037,

Unclassified report

Descriptors: (*Seismology, *Underwater explosions), (*Detection, Seismology), Earthquakes, Underground explosions, Nuclear explosions, Identification systems

An analysis of an underwater HE shot as a continuing study to provide information to aid in distinguishing between earthquakes and explosions. A table of travel times and amplitudes of identified as well as unidentified phases is included. (Author)

AD-631 055 See Fld. 8/11

AD-631 056 See Fld. 8/1

Field 18-NUCLEAR SCIENCE AND TECHNOLOGY

18/2. ISOTOPES

AD-630 571 Fld. 18/2, 7/4
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF PHYSICS
ISOTOPIC MASSES OF HYDROGEN, CHLORINE, BARIUM, CERIUM, AND NEODYMIUM,
by Jay L. Benson, and Walter H. Johnson,Jr.. 30 Aug 65, 11p. Contract Nonr-710 (58),

Unclassified report

Availability: Published in The Physical Review v141 n3 p1112-22 Jan 1966. Copies to DDC users only.

Descriptors: (*Hydrogen, Mass spectrum), (*Chlorine, Mass spectrum), (*Barium, Mass spectrum), (*Cerium, Mass spectrum), (*Neodymium, Mass spectrum), (*Mass spectroscopy, Isotopes), Instrumentation, Alpha decay, Beta decay, Stable isotopes, Nuclear shell models, Nuclear reactions, Radioactive isotopes

The 16-in. double-focusing mass spectrometer at the University of Minnesota was employed to measure the atomic mass of H1 and the atomic masses and isotopic mass differences of chlorine, barium, cerium, and neodymium. Recent improvements in instrumentation have increased the precision of both narrow and wide doublet measurements. The doublet C11H22-C12H10 was used to relate the H1 mass directly to the C12 mass standard with a precision of plus or minus 30 eV. The chlorine masses obtained in this investigation have a precision greater than previous measurements and provide further information about disagreements which were present in previous work. Additional atomic masses are calculated from the stable-mass data of barium, cerium, and neodymium, together with alpha-decay, beta-decay, and nuclear-reaction energies. The resultant table of masses is used to calculate nuclear systematic energies in the region near N = 82. The systematics of the separation energies display very smooth characteristics except at the shell closure of N = 82 and are so regular as to be a powerful aid in the evaluation of some possible errors in reaction and decay data used in the calculation of these nuclear systematics. (Author)

18/3. NUCLEAR EXPLOSIONS

AD-630 644 Fld. 18/3, 12/1, 9/2
CFSTI Prices: HC $5.60 MF $0.50
RAND CORP SANTA MONICA CALIF
NUMERICAL PROGRAMS FOR SOLVING HYPERBOLIC SYSTEMS BY THE METHOD OF CHARACTERISTICS: RADIO EMISSION FROM A NUCLEAR EXPLOSION: PART I,
by G. H. Peebles. Mar 66, 53p. Rept. no. RM-4942,

Unclassified report

Descriptors: (*Radio signals, Nuclear explosions), (*Nuclear explosions, Electromagnetic waves), (*Partial differential equations, Numerical methods + procedures), Programming (Computers)

A presentation of two programs that calculate the solution for a hyperbolic system of partial differential equations with three constant characteristic directions. The computations are on a net of characteristics of variable mesh, the size of the mesh being determined by a criterion of accuracy. The first program ranges over four mesh sizes; the second, over nine. (Author)

AD-630 654 Fld. 18/3
CFSTI Prices: HC $1.60 MF $0.50
NAVAL ORDNANCE LAB WHITE OAK MD AIR|GROUND EXPLOSIONS DIV
TRANSFORMATIONS FOR SCALING OF CLOSE-IN PRESSURES FROM NUCLEAR EXPLOSIONS,
by M. Lutzky, and D. Lehto. 9 Mar 66, 18p.
Task NWER-01.003 (NOL-181),
NOLTR 66-12

Unclassified report

Descriptors: (*Pressure, *Nuclear explosions), Models (Simulations), Shock waves, One-dimensional flow, Scale, Transformations

This report presents scaling methods for pressure -distance curves for a simplified model of a nuclear explosion. It is found that different scaling variables are useful in different regimes, one set yielding a single dimensionless curve in the close-in region, while another set yields a single curve in the limit of large distances. These scaling methods are exact for an ideal gas, except for deviations caused by the second shock. For real air, additional discrepancies are introduced but the scaling is still sufficiently accurate to be useful. (Author)

AD-631 028 Fld. 18/3, 13/13, 8/7
CFSTI Prices: HC $14.60 MF $1.00
NEWMARK HANSEN AND ASSOCIATES URBANA ILL
FEASIBILITY OF MODELING CAVITY BEHAVIOR IN JOINTED ROCK MASSES.
Contract rept. (Final).
Nov 65, 141p. Contract DA-22-079-eng-225,
AEWES CR-1-135

Unclassified report

Descriptors: (*Underground structures, Nuclear explosion damage), (*Rock (Geology), Nuclear explosion damage), (*Nuclear explosions, *Engineering geology), Structural geology, Explosion effects, Models (Simulations), Experimental data, Theory, Model tests

The general scaling relationships for nuclear effects are reviewed. For a spherically symmetric wave which approximates a measured velocity pulse at a given radius, calculations are made to compare the effects at other radii with the measured values. A discussion of the general modeling theory is followed by a discussion of the feasibility of modeling large openings in jointed media both in the laboratory and in the field. It is concluded that model tests in the field are preferred, though certain types of studies in the laboratory will be meaningful if accompanied by field studies. Application of the Hard Hat data to the design of larger openings is discussed. The destressed zone around openings in rock is described and the effect of certain parameters is studied. Consideration is given to the mechanism of rock failure at the cavity walls. The feasibility of studying free field stress wave propagation and structural interaction by using lumped parameter systems is considered. Two types of lumped parameter models now in use are described and extensions of recent work are suggested. Further work is recommended which involves field, laboratory, and theoretical studies. (Author)

AD-631 025 See Fld. 4/1

AD-631 026 See Fld. 15/3

AD-631 105 See Fld. 17/1

18/4. NUCLEAR INSTRUMENTATION

AD-630 693 Fld. 18/4
CFSTI Prices: HC $2.60 MF $0.50
NAVAL RADIOLOGICAL DEFENSE LAB SAN FRANCISCO CALIF
PHOTON, NEUTRON AND CHARGED PARTICLE ABSORBED DOSE MEASUREMENTS WITH A PORTABLE MICROCALORIMETER.
Technical rept.,
by Norman Goldstein, Eugene R. Schleiger, and Eugene Tochilin. 28 Jan 66, 26p. Rept. no. USNRDL-TR-976,
Proj. NWET-B-2,

Unclassified report

Descriptors: (*Calorimeters, Portable), (*Radiological dosage, Calorimeters), (*Photons, Calorimeters), (*Neutrons, Radiological dosage), (*Charged particles, Radiological dosage), Dosimeters, Design, Adsorption, Gamma rays, X rays, Calibration

Two compact, portable microcalorimeters were built and used to measure absorbed dose. A thermal shield near liquid nitrogen temperature provides the necessary isothermal environment for the absorber. Temperature increase of the absorber during irradiation is measured with a thermistor. Tissue equivalent plastic and beryllium absorbers were calibrated for absorbed energy as a function of temperature change by exposures to standard Co60 and Cs137 gamma-ray sources. The beryllium absorber detected gamma-ray doses as low as 0.17 rads (17 ergs/g) with a standard error of 6 percent. Microcalorimetric measurements of absorbed dose from continuous and pulsed X-rays, reactor neutrons, and charged particles were compared to measurements with other dosimeter systems. (Author)

AD-630 866 Fld. 18/4
CFSTI Prices: HC $17.60 MF $1.00
EDGERTON GERMESHAUSEN AND GRIER INC SANTA BARBARA CALIF
DEVELOPMENT OF AIRBORNE SURVEILLANCE INSTRUMENTATION.
Technical rept.,
by John E. Hand, and Harold A. Lamonds. Feb 66, 180p. Rept. no. S-283-R,
Contract DA-49-146-XZ-250,
DASA 1704

Unclassified report

Descriptors: (*Gamma counters, Airborne), Scintillation counters, Cesium compounds, Iodides, Thallium, Photomultipliers, Photofluorescent materials, Pulse discrimination, Charged particles, Radioactive isotopes, Coincidence counting, Gamma -ray spectra

A gamma ray detector was constructed using an inorganic scintillator, CsI (T1), that is viewed by three photomultiplier (PM) tubes. The phosphor is encased in a plastic fluor so that the PM tube array also detects scintillations in the fluor. The detector forms a phoswich assembly (Rev. Sci. Inst. 23:414-417 (1952)), permitting pulse shape discrimination against charged particle reactions occurring within it. External circuitry rejects single signals from the fluor, and fluor/phosphor coincident signals. The unit approaches 100% rejection effectiveness in preventing charged-particle reactions in the detector from introducing signals into the measurement circuitry. Gamma ray losses resulting from gamma-fluor reactions are less than

9% of the total recorded gamma activity in the main CsI (Tl) detector for energies below 1.4 Mev. The detector incorporates a small inset-well crystal lying on the central axis, that is optically separated from the CsI; the ratio of inset-well count rate to main crystal count rate provides a directionality parameter defining source position with respect to crystal axis. The detector shows an energy response linearity within the limitations of the analyzer used in the measurements, + or - 1/2%. The resolution for Cs-137 gamma rays exhibited by the assembly is 15.4%. Gamma ray spectral data can be collected with the charged particle rejection feature in operation. (Author)

AD-631 175 Fld. 18/4
CFSTI Prices: HC $1.60 MF $0.50
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
DETERMINATION OF RELATIVE EFFICIENCIES FOR A MULTIDETECTOR SYSTEM,
by H. L. Crannell, and L. R. Suelzle. Dec 65, 13p. Rept. no. HEPL-401,
Contract Nonr-225 (67)
Unclassified report

Descriptors: (*Radiation monitors, Tests), Electron beams, Spectrum analyzers, Inelastic scattering, Electron accelerators

The greater accuracy of multidetector systems used in conjunction with magnetic spectrometers in high resolution electron scattering experiments has raised the problem of determining accurately the relative efficiencies of the individual detectors. A calibration technique utilizing an unknown spectrum of high energy scattered electrons is presented. Application to present equipment at Stanford University is discussed. (Author)

18/6. RADIATION SHIELDING AND PROTECTION

AD-630 697 **See Fld. 6/18**

18/8. RADIOACTIVITY

AD-630 605 Fld. 18/8, 6/18
CFSTI Prices: HC $6.60 MF $0.75
AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIO
ENVIRONMENTAL RADIOACTIVE BACKGROUND SURVEY FOR THE AIR FORCE NUCLEAR ENGINEERING TEST FACILITY.
Final rept. 1 Jun 57-30 Jun 59,
by David O. Lintz. Dec 65, 62p. Rept. no. AFFDL-TR-65-185,
Proj. AF-7001, Task 700117,
Unclassified report

Descriptors: (*Radioactivity, Environment), Nuclear engineering, Test facilities, Background, Air Force, Health physics, Nuclear explosions, Radiation monitors, Radioactive fallout, Soils, Water, Plants (Botany), Milk, Rainfall, Sampling, Graphics

The environmental radioactive background survey was an attempt to establish a base line of the normally occurring radioactivity in the fauna and flora of a particular area subsequent to the operation of a reactor which will release additional radioactivity to the environment. The Health Physics Office of the AF NETF has collected samples of water, soil, air, sewage, milk, biological life and vegetation in a 20 mile radius of the AF NETF site and analyzed the samples for alpha, beta and gamma activity. The results of the analyses over the period of the report are given in graphic form to facilitate making comparison of the fluctuations in the normal background. The wide variations were due to the atom bomb testing not only in the United States but throughout the world. The tests especially noticeable are the result of the last half quarter of 1958 when the atom bomb testing was at a peak. Future samples taken from the same areas will be analyzed when the reactor becomes operational. Comparison then can be made to determine any increased activity which may be attributable to the AF Nuclear Reactor operation. In order to obtain certain quantitative analyses of the radioactive content of the various samples collected a contract was awarded the Nuclear Science and Engineering Corporation of Pittsburgh, Pennsylvania. The result of their work will be found in Appendix II of the report. (Author)

AD-630 701 **See Fld. 20/12**

AD-630 835 **See Fld. 9/1**

AD-630 836 **See Fld. 9/1**

AD-630 923 **See Fld. 11/6**

AD-630 937 **See Fld. 8/10**

18/9. REACTOR ENGINEERING AND OPERATION

AD-630 698 Fld. 18/9, 20/8
CFSTI Prices: HC $3.60 MF $0.50
ARMED FORCES RADIOBIOLOGY RESEARCH INST BETHESDA MD
A DETAILED DERIVATION OF THE COURANT-WALLACE EXPRESSIONS FOR THE SECOND MOMENTS OF THE NEUTRON PROBABILITY DISTRIBUTION AND FOR THE VARIANCE/MEAN RATIO.
Technical note,
by Horace Schow. Oct 65, 32p. Rept. no. AFRRI-TN-65-1,
Unclassified report

Descriptors: (*Nuclear reactors, Neutron flux), (*Neutrons, Distribution), Probability, Stochastic processes, Equations

A detailed mathematical derivation and verification of the three Courant-Wallace expressions, which have the three second moments of the neutron probability distribution in a pile as the three unknowns, are given. The solution of these equations for a steady pile with one equivalent delayed neutron group for the variance/mean ratio is verified. Minor corrections to the original Courant-Wallace text are noted. (Author)

Field 19-ORDNANCE

19/1. AMMUNITION, EXPLOSIVES, AND PYROTECHNICS

AD-630 988 Fld. 19/1, 1/3
CFSTI Prices: HC $15.60 MF $1.00
NAVAL WEAPONS LAB DAHLGREN VA
APPLICATION OF NEW TECHNIQUES FOR IDENTIFICATION OF HERO VARIABLES.
Technical memo.,
by J. H. Richter, R. W. Carson, and F. Smith. Feb 66, 160p. Rept. no. W-5/66,
Unclassified report

Descriptors: (*Explosives initiators, Hazards), (*Electromagnetic waves, Hazards), (*Weapon systems, Hazards), (*Hazards, Analysis of variance), (*Aircraft, Electromagnetic fields), Weapons, Antenna radiation patterns, Military personnel, Identification, Antennas, Rocket launchers, Simulation

The purpose of the study, in keeping with the approach to the problem of estimating the degree of hazard of electromagnetic radiation to the weapon system, is the identification of HERO variables. The crew simulation technique was used to reduce the experimental error and to generate the redundant data necessary for a study of the interactions.

19/4. EXPLOSIONS, BALLISTICS, AND ARMOR

AD-630 592 Fld. 19/4, 20/11
CFSTI Prices: HC $2.00 MF $0.50
FELTMAN RESEARCH LABS PICATINNY ARSENAL DOVER N J
LARGE DEFLECTIONS IN CLAMPED CIRCULAR PLATES.
Technical rept.,
by L. Ellington, and D. Ellington. Sep 63, 30p. Rept. no. TR-3109,
Unclassified report

Descriptors: (*Metal plates, Deformation), (*Explosive effects, Metal plates), Aluminum, Deformation, Loading (Mechanics), Explosive materials, Anchors (Structural), Impact tests, Disks, Deflection, Fracture (Mechanics), Failure (Mechanics)

The stresses induced by large deflections have been derived for the case of a clamped flat circular plate that is uniformly loaded to its failure point. The analysis is based on an assumed deflection contour and is, therefore, an approximation. However, the boundary conditions are satisfied and the relatively uncomplicated expressions for membrane and bending stress yield critical impulse values which may be scaled successfully to apply to plates of other dimensions. The expressions for the principal stresses in a clamped flat circular plate are analyzed.

AD-631 103 Fld. 19/4, 20/4
CAVENDISH LAB UNIV OF CAMBRIDGE (ENGLAND)
CAVITIES AND MICRO MUNRO JETS IN LIQUIDS: THEIR ROLE IN EXPLOSION,
by F. P. Bowden, and M. P. McOnie. 1965, 6p.
Contract AF-EOAR-24-65,
AFOSR 66-0116
Unclassified report

Availability: Published in Nature v206 n4982 p380-3 Apr 24 1965. Copies to DDC users only.

Descriptors: (*Liquid jets, *Explosions), (*Cavitation, Liquids), Shock waves, Great Britain, Nitroglycerin, Impact shock, Drops, Explosion bubbles

AD-630 813 **See Fld. 4/2**

AD-630 913 **See Fld. 11/9**

AD-630 919 **See Fld. 19/5**

AD-631 159 **See Fld. 21/2**

19/5. FIRE CONTROL AND BOMBING SYSTEMS

AD-630 919 Fld. 19/5, 19/4
CFSTI Prices: HC $2.60 MF $0.50
FRANKFORD ARSENAL PHILADELPHIA PA FIRE CONTROL ENGINEERING DIRECTORATE
HIT PROBABILITY ON A TANK TYPE TARGET.
Memorandum rept.,
by R. Pfeilsticker, and J. Glynn. Mar 66, 21p.
Proj. DA-1X120301D02301,
FA M66-18-1
Unclassified report

Descriptors: (*Impact prediction, *Fire control systems), (*Kill probability, Surface targets), Ballistics, Mathematical models, Artillery fire, Targets, Tanks (Combat vehicles)

A mathematical model was developed that may be used to determine salvo hit probability as a function of the number of rounds in the salvo, target size, aim error and round to round variation (dispersion). The report indicates graphically the value of dispersion that maximizes the salvo hit probability on a tank type target for a given num-

ber of rounds and a given aim error. The conclusions indicate that the dispersion should be approximately equal to the bias in order to maximize the salvo hit probability on a tank type target (7-1/2 ft. x 7-1/2 ft.). Although the model was developed based on the salvo assumption, it does serve to provide a measure of the effectiveness of high rate of fire weapons, where the relationship between bias and dispersion may approach that of a salvo. The salvo assumption, i.e. that the aim error (bias) is considered constant during the firing interval and round to round dispersion may be superimposed upon this bias, leads to hit probabilities less than those obtained by the 'independence of rounds' assumption generally employed for calculation of low rate of fire weapons. For high rate of fire weapons, actual hit probabilities would be expected to fall somewhere between the two solutions depending on the degree of round to round correlation existing in the fire control system. (Author)

19/6. GUNS

AD-630 686 Fld. 19/6, 20/11
CFSTI Prices: HC $4.60 MF $0.50
WATERTOWN ARSENAL MASS
SELECTED DESIGN DATA PERTAINING TO GUN TUBES AND HIGH-PRESSURE VESSELS,
by Donald H. Newhall. 6 Dec 43, 42p. Rept. no. WGD-4,
Unclassified report

Descriptors: (*Gun barrels, Design), (*Pressure vessels, Design), Cylindrical bodies, Stresses, Strain (Mechanics), High-pressure research, Elasticity, Plasticity

AD-630 758 Fld. 19/6, 20/11
CFSTI Prices: HC $1.00 MF $0.50
WATERTOWN ARSENAL LABS MASS
STRESSES IN GUN TUBES STRESSES IN GUNS UNDER COMBINED BAND AND GAS PRESSURES. PART 10, MATCHING OF THE EXTERNAL TANGENTIAL STRAIN DATA IN SMOOTH-BORED ELASTIC GUNS UNDER A DISCONTINUOUS BAND OF INTERNAL RADIAL PRESSURE BY A SIMPLE MATHEMATICAL EXPRESSION.
Experimental rept.,
by O. L. Bowie. 21 Oct 46, 8p. Rept. no. WAL-730/137-9-Pt-10,
Unclassified report

Descriptors: (*Gun barrels, Stresses), Strain (Mechanics), Elastic shells, Pressure, Mathematical analysis

The object of the report is to present a simple mathematical expression from which the external tangential strains in smooth-bored elastic guns under a discontinuous band of internal radial pressure may be calculated.

Field 20-PHYSICS

20/1. ACOUSTICS

AD-630 551 Fld. 20/1
CFSTI Prices: HC $1.00 MF $0.50
NAVY UNDERWATER SOUND LAB NEW LONDON CONN
COMPUTATION OF TRANSDUCER VELOCITIES FOR VERY LARGE TRANSMITTING ARRAYS.
Research rept.,
by David T. Porter. 23 Mar 66, 20p. Rept. no. USL-741,
Proj. SF-101-03-18-11213 ,USL-1-452-00-00
Unclassified report

Descriptors: (*Transducers, Calibration), (*Acoustics, Transducers), Sound transmission, Velocity, Numerical analysis, Digital computers

A method is proposed to compute the transducer velocities for large transmitting arrays by dividing each array into overlapping patches. Justification of the method is given in the form of computer results for line arrays of 10 to 30 elements steered from broadside at 60 degrees, 75 degrees, and 90 degrees. It is shown that for the trailing end of an array steered close to end-fire, the transducer velocities are nearly independent of the length of the array. (Author)

AD-630 682 Fld. 20/1, 20/4
CFSTI Prices: HC $1.60 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C
EXCITATION OR RESONANCE BY AIR FLOW (VOZBUZHDENIE REZONATOROV POTOKOM VOZDUKHA),
by D. I. Blokhintsev. Jan 57, 13p. Rept. no. Trans-270,
Unclassified report

ZhTF, v15 p63-70 (USSR) 1945.

Descriptors: (*Resonance, Gas flow), (*Vortices, Acoustic properties), Noise, Air, Flowmeters, Microphones, Oscillation, Sound, Turbulence, USSR

The paper presents the results of an experimental investigation of the excitation of sound by an air stream blowing over the mouth of a resonator. It is shown that this excitation can be regarded as the result of resonance between the oscillations of a system of vortices, which are shed at the edges of the resonator, and the natural oscillations of the resonator. (Author)

AD-630 684 Fld. 20/1, 20/4
CFSTI Prices: HC $4.60 MF $0.50
DAVID TAYLOR MODEL BASIN WASHINGTON D C HYDROMECHANICS LAB
THE NEAR-SOUND FIELD OF TURBULENCE,
by G. J. Franz. Oct 59, 41p. Proj. NS715-102, DTMB 982
Unclassified report

Descriptors: (*Turbulence, *Acoustic properties), Sound, Turbulent boundary layer, Jets, Sound transmission, Mathematical analysis, Velocity

General expressions for the velocity potential, particle velocity, instantaneous sound pressure, mean-square sound pressure, and sound intensity for the sound generated by turbulence are derived, starting from Lighthill's fundamental relations for the density fluctuations in the medium outside a turbulent region. The dipole radiation from the turbulent boundary layer of a rigid boundary, the quadrupole radiation from isotropic turbulence, and the lateral quadrupole radiation from turbulence in the presence of a large mean shear are discussed. The frequency spectra and directional patterns of the sound observed at points in the sound field that are much less than a wavelength from multipole sound sources are shown to differ significantly from the frequency spectra and directional patterns of the sound observed at points in the sound field that are many wavelengths from the multipole sound sources. (Author)

AD-630 695 Fld. 20/1
CFSTI Prices: HC $5.60 MF $0.50
INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA RESEARCH AND ENGINEERING SUPPORT DIV
TIME AND FREQUENCY CHARACTERISTICS OF AN ACOUSTIC SIGNAL REFLECTED FROM A ROUGH BOUNDARY.
Research paper,
by John J. Martin. Feb 66, 53p. Contract SD-50, Task T-37,
Unclassified report

Descriptors: (*Sound signals, Propagation, Time, Frequency, Pulse transmitters, Multipath transmission, Underwater sound

This paper contains an analysis for determining the time of arrival and doppler frequency characteristics of a pulse transmitted to a target by reflection from a not-too-rough surface such as the sea bottom, and gives numerical values for a typical sonar application. The analysis may be important in sonar signal processing associated with one-way or round-trip transmission and in the theinterpretation of data from marine geophysical surveys; it may in addition have application to propagation of electro-mechanical waves by ionospheric refraction. (Author)

AD-630 794 Fld. 20/1, 20/11
CFSTI Prices: HC $14.60 MF $1.00
MASSACHUSETTS INST OF TECH CAMBRIDGE
RANDOM VIBRATION OF COUPLED OSCILLATORS AND COUPLED STRUCTURES.
Doctoral thesis,
by Terry Don Scharton. Oct 65, 143p. Contract AF 49 (638)-1314, AFOSR 66-0156
Unclassified report

Descriptors: (*Vibration, Oscillation), (*Oscillation, Vibration), (*Structures, Vibration), Noise, Couplings, Statistical mechanics, Beams (Structural), Power, Time, Energy, Kinetic energy, Inertia, Gyroscopes

It is proved that the time average power flow between two linearly coupled linear oscillators excited by independent white noise sources is proportional to the difference in the time average energies of the oscillators. This proportionality is valid even when the oscillators are strongly coupled if the oscillator energies are defined correctly. The validity of power-flow energy-difference proportionality in systems of more than two oscillators is hypothesized. Some conceptual difficulties involved in formulating a coupled mode model of coupled structures are discussed. An experimental investigation of a beam-beam structure demonstrates that the coupled oscillator power flow calculation can be used to predict power flow and energy sharing in coupled continuous structures excited with broadband noise. (Author)

AD-631 003 Fld. 20/1
CFSTI Prices: HC $3.00 MF $0.75
LOCKHEED-CALIFORNIA CO BURBANK
A STUDY OF METHODS FOR EVALUATING SONIC BOOM EFFECTS,
by James D. Revell, and Jim Rogers Thompson. 1 Jul 65, 71p. Rept. no. LR-18996,
Unclassified report

Descriptors: (*Sonic boom, Mathematical analysis), (*Acoustics, Sonic boom), Jet plane noise, Sound transmission, Atmosphere, Noise analyzers, Spectrum analyzers, Wave functions

A method for predicting and evaluating the effects of sonic booms on people and structures is needed both for the general problem and particularly for comparison of the near-field signatures of candidate SST configurations differing in area distribution. This report presents and discusses the results of two approaches to this problem. One method involves conventional transient time-history procedures and the other an investigation of the applicability of random process spectrum techniques. Both methods indicate that there is little difference between either the spectra of or system response to the near-field signatures of airplanes having conventional and three-halves power area distributions. The indicated effects of either near -field signature are less than those of the N-wave signature computed for the same airplanes and flight condition by the FAA far-field evaluation method. (Author)

AD-631 016 Fld. 20/1, 20/4
CFSTI Prices: HC $3.00 MF $0.75
HARVARD UNIV CAMBRIDGE MASS ACOUSTICS RESEARCH LAB
CAVITATION DYNAMICS: I. A MATHEMATICAL FORMULATION.
Technical memo.,
by H. G. Flynn. Jan 66, 67p. Rept. no. TM-50,
Contract Nonr-1866 (24), Proj. NR-384-903,
Unclassified report

Prepared in cooperation with Rochester Univ., N. Y., Acoustical Physics Lab., Contract Nonr-668 (18).

Descriptors: (*Dynamics, Cavitation), (*Cavitation, *Acoustics), Heat transfer, Viscosity, Mathematical models, Equations of motion

A central problem in the study of acoustic cavitation is that of understanding the dynamics of small, isolated bubbles set in motion in a liquid by a sound field. The complicated, nonlinear nature of such motions has served in the past to limit investigations to the study of very simple models of such bubbles. However, the advent of large digital computers now makes it possible to construct more realistic models with a reasonable expectation that numerical calculation of their motions will give a deepter insight into cavitation phenomena. In order to exploit this possibility, a mathematical formulation has been constructed in the form of a set of nonlinear ordinary differential and algebraic equations that can be solved simultaneously, and economically, on a digital computer. Two objectives of this program of computation have been to obtain numerical solutions of this formulation that give reliable estimates of physical quantities associated with bubbles in violent motion and to assess the effects of heat conduction, viscosity, sound radiation, and surface tension of such quantities. In this report, the formulation is derived and an assessment of the reliability of its predictions made. (Author)

AD-631 080 Fld. 20/1, 8/10, 17/1, 14/2
CFSTI Prices: HC $2.00 MF $0.50
NAVAL WARFARE RESEARCH CENTER STANFORD RESEARCH INST MENLO PARK CALIF
SEISMOMETERS ON ARCTIC ICE FOR DETECTION OF UNDERWATER ACOUSTIC DISTURBANCES.
Technical rept. no. 1, 1 Nov 65-1 Mar 66,
by Norman E. Goldstein. Apr 66, 34p. Contract Nonr-2332 (00), Proj. SRI-ETU-2167-612,
Unclassified report

Descriptors: (*Seismometers, Ice islands), (*Acoustics, Arctic Ocean), (*Arctic Ocean, *Underwater sound), Marine geophysics, Acoustic detectors

In the Arctic Ocean the ice cover limits the usefulness of hydrophones because of the necessity to create or to locate openings in the ice through which to lower a hydrophone. On the other hand, the ice cover provides a convenient platform for seismometers, which are sensitive to the ice motions induced by an underwater acoustic source. Seismometers can be installed at almost any desired location on the Arctic Ocean, and if air dropped, numerous transducers can be installed rapidly. Furthermore, the Arctic Ocean provides an acoustical environment that permits the long range propagation of sound at frequencies for which the common exploration-type seismometer (geophone) is most sensitive, 10 to 100 cps. Because the wavelengths corresponding to these low frequencies are large compared to the average thickness of sea ice, and because the acoustic impedance mismatch between sea-water and sea-ice is small compared to the mismatch between sea-water and air, the ice should have little effect on the propagation of low-frequency acoustical energy through the Arctic Ocean. Thus, as a first approximation it can be assumed that the low-frequency particle velocities arising in sea ice from a distant underwater source should be the same as on the surface of an ice-free ocean with the acoustical properties of the Arctic Ocean. (Author)

AD-631 167 Fld. 20/1, 12/1
LINCOLN LAB MASS INST OF TECH LEXINGTON
ON SOME NEW RESULTS IN SHOT-NOISE,
by Oscar A. Z. Leneman. 26 Oct 65, 2p. Rept. no. JA-2694,
Contract AF 19 (628)-5167,
ESD TDR-66-152
Unclassified report

Availability: Published in Proceedings of the IEEE v53 n12 p2130 Dec 1965. Copies to DDC users only.

Descriptors: (*Statistical functions, *Noise)

Expressions for the third-order and fourth-order correlation functions for shot-noise are given. (Author)

AD-630 770 See Fld. 17/1

AD-630 869 See Fld. 13/11

AD-631 035 See Fld. 9/5

20/2. CRYSTALLOGRAPHY

AD-630 573 Fld. 20/2
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
A DENSE PACKING OF HARD SPHERES WITH FIVE-FOLD SYMMETRY.
Technical rept.,
by B. G. Bagley. Jan 66, 5p. Rept. no. TR-5,
Contract Nonr-1866 (50), Proj. NR-032-485,
Unclassified report

Availability: Published in Nature v208 n5011 p674-5 13 Nov 1965. Copies to DDC users only.

Descriptors: (*Symmetry (Crystallography), *Crystallization), Whiskers (Crystals), Crystal structure

AD-630 931 Fld. 20/2, 14/2
CFSTI Prices: HC $1.00 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
DEVICE FOR RAPID ORIENTATION OF CRYSTALS BY DIRECT-IMAGE X-RAY TECHNIQUE.
Instrumentation papers,
by Ferdinand Euler. Feb 66, 23p. Rept. no. AFCRL-IP-93,AFCRL-66-106
Proj. AF-5621, Task 562104,
Unclassified report

Descriptors: (*Crystal lattices, *Display systems), (*X-ray diffraction analysis, Display systems), Image intensifiers, Remote control systems, Photographic analysis, Optical equipment

A device was designed, built, and tested, which facilitates the rapid orientation of crystals by direct inspection of an electronically intensified optical image of their Laue patterns. Remote controls permit the rotation of the sample about two axes during the X-ray exposure. The pattern can also be recorded on fast Polaroid film. The operating characteristics of the device are described. (Author)

AD-631 041 Fld. 20/2, 20/6, 20/5
CFSTI Prices: HC $4.00 MF $0.75
TEM-PRES RESEARCH INC STATE COLLEGE PA
LIGHT SCATTERING TECHNIQUES FOR CRYSTAL EVALUATION.
Final rept., 1 Jul-31 Dec 65,
by V. Vand, E. A. Margerum, F. Schwab, and R. I. Harker. 31 Jan 66, 111p. Contract AF 19 (628)-5213, Proj. AF-5620, Task 562005, AFCRL 66-119
Unclassified report

Descriptors: (*Crystals, Optical analysis), (*Light, Crystallography), (*Lasers, Crystallography), Ruby, Single crystals, Crystal lattice defects, Non-destructive testing, Light transmission, Scattering, Optics, Programming (Computers)

The work described in this report has resulted in (1) the development of the theory of light scattering by various crystal imperfections, (2) the production of computer programs for the calculation of light scattering functions, (3) the computer tabulation of specific values for scattering factors or amplitude functions, intensity functions and Mie coefficients as a function of various selected angles of scattering from 0 to 180 degrees and various sizes of spherical voids from 10 to 10,000 A radius, (4) specific tables of the functions of pi and tau occurring in Mie's theory for light scattering calculations, and (5) an engineering design of an optical system utilizing a continuous laser for observing, evaluating, recording and determining the arrangement of defects in crystals. (Author)

AD-631 073 Fld. 20/2, 20/12
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
THE GROWTH OF SINGLE CRYSTALS.
Physical sciences research papers,
by Charles S. Sahagian. Jan 66, 65p. Rept. no. AFCRL-PSRP-186,AFCRL-66-33
Proj. AF-5621, Task 562101,
Unclassified report

Original document in color until exhausted.

Descriptors: (*Single cyrstals, Crystal growth), (*Crystal growth, Reviews), Doping, Oxides, Garnet, Silicates, Ferrites, Fluorides, Physical properties, Electromagnetic properties, Tables

Single crystals of over 100 different electronically active materials have been synthesized using a variety of methods, including growth by flame-fusion, flux, melt, gel diffusion, low-temperature solution, vapor, as well as synthesis by ultra-high-pressure techniques. These crystals, including a large number of doped specimens, emphasize oxides, garnets, silicates, ferrites, fluorides, as well as a large variety of other electromagnetic materials. Charts are presented giving summary data on single crystals grown, percentage and kind of dopants, growth methods and apparatus, crystal dimensions and other physical characteristics, primary research interest or use, crystal system, class, space group, and pertinent references. Several of the growth methods and recent Laboratory accomplishments are described. (Author)

AD-631 179 Fld. 20/2, 14/2
CFSTI Prices: HC $1.00 MF $0.50
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J MATERIALS RESEARCH LAB
A PRECISE DETERMINATION OF INTERPLANAR SPACING FROM DIVERGENT BEAM PHOTOGRAPHS.
Technical rept. no. 1, Sep 65-Apr 66,
by A. Shrier, Z. H. Kalman, and S. Weissmann.
Apr 66, 9p. Contract DA-31-124-ARO (D)-414, Proj. CRD-AA-L-5803-MC
AROD 5803:2
Unclassified report

Descriptors: (*Crystal lattices, *X-ray diffraction analysis), Photographic analysis, Matrix algebra, Vector analysis

Precise lattice parameter determination by means of the divergent x-ray beam method is simplified by placing a wire grid between film and specimen, and employing a double-exposure technique. Shadows cast by the grid appear as breaks in the ellipses of the pattern. The film coordinates of these breaks are utilized to calculate the d-values of the reflecting planes. (Author)

AD-630 572 See Fld. 11/6

AD-630 705 See Fld. 13/8

AD-630 949 See Fld. 11/6

AD-630 959 See Fld. 11/6

AD-631 044 See Fld. 20/12

20/3. ELECTRICITY AND MAGNETISM

AD-630 532 Fld. 20/3, 20/14, 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON AN INTEGRAL EQUATION IN ELECTROMAGNETIC DIFFRACTION THEORY.
Technical summary rept.,
by P. Werner. Aug 65, 28p. Rept. no. MRC-TSR-595,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Integral equations, Electromagnetic fields), (*Electromagnetic fields, Integral equations), (*Electromagnetic wave reflections, Integral equations), (*Electromagnetism, Integral equations), Electromagnetic waves, Diffraction, Theory, Mathematical analysis

This paper contains investigations on the integral equations which are of interest in the study of the behavior of totally reflected stationary electromagnetic wave fields as the frequency tends to zero. It is shown that both integral equations have exactly p linearly independent solutions where p is the topological genus of S. (Author)

AD-630 539 Fld. 20/3, 20/14, 12/1
CFSTI Prices: HC $3.00 MF $0.75
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON THE BEHAVIOR OF STATIONARY ELECTROMAGNETIC WAVE FIELDS FOR SMALL FREQUENCIES.
Technical summary rept.,
by P. Werner. Feb 66, 79p. Rept. no. MRC-TSR-605,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Electromagnetism, Mathematical analysis), (*Electromagnetic fields, Mathematical analysis), (*Electromagnetic wave reflections, Mathematical analysis), Boundary value problems, Partial differential equations, Potential theory

This paper contains investigations on the stationary electromagnetic field (E,H) which is generated by the reflection of a given incoming field at a finite number of simply connected perfectly conducting bodies. A method is described which allows us to discuss the behavior of the magnetic field H as the frequency tends to zero. This supplements previous investigations on the behavior of the electric field E for small frequencies. Several examples are considered in detail (frequencyindependent boundary data, reflection of electric and magnetic dipoles, reflection of fields generated by volume distributions of electric currents). Similar results are obtained for the corresponding interior boundary value problems, by applying a method which has recently been developed by R. C. MacCamy. (Author)

AD-630 611 Fld. 20/3
CFSTI Prices: HC $2.60 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
THE NONLINEAR CONDUCTIVITY OF A WEAKLY IONIZED, NON-MAXWELLIAN MAGNETOPLASMA.
Physical sciences research papers,
by Richard E. Haskell, and Robert J. Papa. Feb 66, 26p. Rept. no. AFCRL-PSRP-191,AFCRL-66-81
Proj. AF-4642, Task 464202,
Unclassified report

Descriptors: (*Plasma medium, *Electrical conductance), Magnetic fields, Ionization, Distribution functions, Electric fields, Polarization, Velocity

The a-c conductivity of a weakly ionized plasma can be calculated by making a spherical harmonic expansion of the electron velocity distribution function. This conductivity determines the propagation characteristics of rf waves in the plasma. If the plasma is immersed in a d-c magnetic field, the isotropic part of the distribution function depends upon the polarization of the rf wave; that is, it depends upon how the electromagnetic energy is divided among the right and left circularly polarized modes and the longitudinal mode. When the magnetic field is reduced to zero, the function reduces to the form first derived by Margenau. A closed form expression for the function can be obtained for the case of a constant electron mean free path. A nonlinear conductivity tensor can be derived in which each component is a function of the polarization of the local rf field. Curves of the conductivity tensor components in the principal coordinate system as a function of the energy in the right and left circular modes are presented for propagation along the magnetic field. (Author)

AD-630 713 Fld. 20/3
INSTITUTE OF OPTICS UNIV OF ROCHESTER N Y
INTRINSIC PHOTOCONDUCTIVITY IN THE ALKALI HALIDES.
Revised ed.,
by G. R. Huggett, and K. Teegarden. 28 Jun 65, 6p. Contract DA-31-124-ARO (D)-252,
AROD 2045:10
Unclassified report

Revision of manuscript submitted 3 Dec 64.

Availability: Published in The Physical Review v141 n2 p797-802 Jan 1966. Copies to DDC users only.

Descriptors: (*Photoconductivity, *Halides), (*Alkali metal compounds, Halides), Rubidium compounds, Potassium compounds, Iodides, Bromides, Chlorides, Photoelectric effect

Photoconductivity in thin films of RbI, KBr, and KCl has been measured at temperatures of 10 and 80K in the spectral range from 5.5 to 10 eV. The Schubweg of the photoelectrons and the yield of photoelectrons per incident quantum were determined. In the case of RbI the data tend to confirm the existence of exciton states lying between the two components of the familiar spin-orbit doublet, as was recently suggested by Fischer and Hilsch. (Nachr. Akad. Wiss. Gottingen, II. Math. Physik Kl. 8,241 (1959)). It is estimated that the band gaps of RbI, KBr, and KCl are 6.37, 8.0, and 8.7 eV, respectively. (Author)

AD-630 864 Fld. 20/3, 17/9
CFSTI Prices: HC $1.60 MF $0.50
MITRE CORP BEDFORD MASS
POLARIZATION EXTENSIONS OF THE MONOSTATIC-BISTATIC EQUIVALENCE THEOREM,
by S. H. Bickel. Jan 66, 20p. Rept. no. TM-4242,
Contract AF 19 (628)-5165,ARPA Order-596
Proj. AF-8051,
ESD TR-65-150
Unclassified report

Descriptors: (*Polarization, *Magneto-optic effect), Electromagnetic wave reflections, Field theory, Convex bodies, Diffraction, Bistatic radar, Monostatic radar

For convex non-depolarizing bodies, the monostatic-bistatic approximation is exact to first order terms in the bistatic angle. The second order error effect causes widening of the lobe structure with increasing bistatic angle. For depolarizing bodies, the error is again second order in the bistatic angle provided that the depolarizing edges have parallel orientation. Consequently, the theorem can be extended to convex bodies of revolution. (Author)

AD-630 874 Fld. 20/3, 20/6
CFSTI Prices: HC $1.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
INVESTIGATION OF CHARACTERISTICS OF INFLOW OF AL-ZN ALLOY MATERIAL INTO AN AC ARC DISCHARGE AND CONCENTRATION DEPENDENCE OF THE INTENSITY OF ALUMINIUM AND ZINC LINES,
by E. S. Obukhova, and N. K. Rudnevskii. 20 Jan 66, 11p. Rept. no. FTD-TT-65-1503,
TT 66-60967
Unclassified report

Unedited rough draft trans. of Trudy po Khimii i Khimicheskoi Tekhnologii (USSR) n1 p43-6 1963.

Descriptors: (*Electric discharges, *Aluminum alloys), (*Zinc alloys, Electric discharges), Alternating current, Electric arcs, Spectroscopy, Atomic spectroscopy, Aluminum, Zinc, Concentration (Chemistry), USSR

Peculiarities of the entrance of the substance of Al-Zn alloys into the radiating cloud of an ac arc and the concentration dependence of the intensity of the zinc and aluminium lines were investigated. The rate of entry depends on the composition of the alloy. It may be assumed that the character of the concentration dependence of the intensity of the spectral lines of aluminium and zinc significantly depends on the peculiarities of entry of these elements into the discharge arc, the change in temperature of the irradiating cloud and the degree of ionization of the atoms. Without preliminary burning of the electrodes in the range of 20 - 32% zinc in the alloy an anomalous dependence of zinc concentration in the products of entry on the concentration of zinc in the alloy is observed. After preliminary burning for 80 sec the anomalous dependence is eliminated. There was absence of a correspondence between the change in zinc concentration in the entry products for the indicated interval of zinc concentration in the alloy and of the relative intensity of the zinc and aluminium lines. Reasons relative to the cause of this noncorrespondence are pointed out. (Author)

AD-630 899 Fld. 20/3
CFSTI Prices: HC $2.00 MF $0.50
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
DEVIATIONS FROM INTEGRATING SPHERE THEORY CAUSED BY CENTRALLY LOCATED SAMPLES,
by J. P. Dawson, D. C. Todd, B. E. Wood, B. A. McCullough, and R. C. Birkebak. Apr 66, 42p. Rept. no. AEDC-TR-65-271,
Contract AF 40(600)-1200, Proj. AF-8951, SW2407
Unclassified report

Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Spheres, *Reflectometers), Operation, Analysis

A review of the assumptions made in the theory of the classical integrating sphere is given. The validity of these assumptions as applied to a modified integrating sphere is discussed in terms of a computer analysis and experimental data. The results of the analysis indicate that a possible error of 15 percent may be introduced into the absolute reflectance determinations. This can occur when

the classical theory is applied to a modified integrating sphere using the angular-hemispherical technique. The parameters considered in the analysis are irradiance, sphere radius, sample reflectance, specular component of the sample, angle of incidence, and detector location. (Author)

AD-630 930 Fld. 20/3, 20/12
CFSTI Prices: HC $2.00 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
MEASUREMENT OF MINORITY CARRIER LIFETIME IN GERMANIUM AND SILICON BY THE SPREADING RESISTANCE PHOTO DECAY METHOD. CALORIMETRIC METHOD OF MEASURING ABSORBED POWER IN ELECTROLUMINESCENCE,
by Chuang Wei-Hua, Pan Kuei-Sheng, Chang Kuang-Chi, and Hsu Shao-Hung. Dec 65, 26p.
Rept. no. FSTC-381-T65-667,
Proj. G7-1050,
TT 66-60984
Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v18 n5 p250-3 1962; v19 n3 p191-201 1963.

Descriptors: (*Carriers (Semiconductors), Measurement), (*Photoconductivity, Carriers (Semiconductors)), (*Semiconductors, Carriers (Semiconductors)), (*Electroluminescence, Calorimetric analysis), Germanium, Silicon, Resistance (Electrical), Excitation, Power, Absorption, China

The photo-conductive decay of spreading resistance in contact with germanium and silicon of different surface conditions, subjected to photo-excitation of different spectral compositions was studied and a simple method for the measurement of semi-conductor lifetime is presented. The second paper describes the use of calorimetric method to measure electric power absorption in electroluminescence. The method is based on the principle of conservation of energy; therefore, effects of harmonics and frequency in the measurement are eliminated. Preliminary experimental results indicate measurement error for readings under five microwatts (mW) is less than 5%. (Author)

AD-631 068 Fld. 20/3, 20/12
CFSTI Prices: HC $1.60 MF $0.50
ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS MATERIALS RESEARCH DIV
MAGNETORESISTANCE OF COBALT,
by Alfred S. Marotta, and Kenneth J. Tauer. Jan 66, 14p. Proj. D/A-1A01050B010,
AMRA TR-66-02
Unclassified report

Descriptors: (*Cobalt, Magnetic properties), (*Resistance (Electrical), Cobalt), Magnetic fields, Atomic energy levels, Surface properties, Solid state physics, Single crystals

Measurements were made on the longitudinal and transverse magnetoresistance of cobalt single crystals at 4.2 K. The principal changes due to the magnetic field are those of an ordinary metal plus effects peculiar to the magnetic state. In addition, Shubnikov-de Haas-like oscillations are observed in certain orientations. These are discussed as clues to the Fermi surface of cobalt. (Authors)

AD-630 621 See Fld. 20/10

AD-630 653 See Fld. 5/1

AD-631 166 See Fld. 9/5

20/4. FLUID MECHANICS

AD-630 522 Fld. 20/4, 20/13
CFSTI Prices: HC $3.00 MF $0.75
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
A DISCUSSION OF ENERGY AND MOMENTUM TRANSFER IN GAS-SURFACE INTERACTIONS.
Rept. for Jun 64-Aug 65,
by R. E. Stickney. Feb 66, 69p. Rept. no. AEDC-TR-66-13,
Contract AF 40(600)-1200, Proj. AF-8951, ARO-SW3417
Unclassified report

Prepared in cooperation with ARO, Inc., Air Force Station, Tullahoma, Tenn.

Descriptors: (*Transport properties, Surfaces), (*Momenum, Transport properties), (*Energy, Transport properties), (*Gases, Transport properties), (*Solids, Transport properties), Adsorption, Atoms, Flight

The principal mechanisms of energy and momentum transfer between gas atoms and solid surfaces are considered for the range of impact energies encountered in high-speed flight (e.g., up to 10 ev). Included within are (1) introductory discussions of the nature of surfaces, intermolecular potentials, adsorption, and basic gas -surface interaction processes, (2) a critical survey of the definitions of energy and momentum accommodation coefficients, (3) summaries of existing theoretical and experimental results pertaining to the energy accommodation and directional distribution of atoms scattered from a surface, (4) an attempt to formulate the main parameters and regimes of gas-surface interactions, and (5) suggestions concerning future investigations. (Author)

AD-630 529 Fld. 20/4, 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
APPLICATION OF INTEGRAL OPERATORS TO SINGULAR DIFFERENTIAL EQUATIONS AND TO COMPUTATIONS OF COMPRESSIBLE FLUID FLOWS.
Technical summary rept.,
by Stefan Bergman. Jan 66, 50p. Rept. no. MRC-TSR-586,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Compressible flow, Mathematical analysis), (*Tramsonic flow, Boundary value problems), (*Operators (Mathematics), Integrals), Subsonic flow, Partial differential equations, Numerical analysis, Functions

The application of the method of integral operators in the theory of partial differential equations is discussed. The operators transforming analytic functions f (u) of one variable into solutions of D (psi) = zero and their inverses are described. A survey of results about the theorems which follow by 'transplanting' relations in the theory of analytic functions of one and several variables is presented. Among others, theorems about approximation of a solution by linear combination are discussed. Here psi sub v, v = 1, 2, ... is a set of particular solutions. The construction of the psi sub v and application of this approach to the solution of boundary value problems are presented. The equation arises in the theory of compressible fluids. The constructions of subsonic and transonic flows are described and examples are given. The use of the difference method in connection with the computation of flow patterns using the integral operator method is discussed. (Author)

AD-630 530 Fld. 20/4
CFSTI Prices: HC $3.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
NUMERICAL STUDY OF A VISCOUS FLUID PAST A CIRCULAR CYLINDER.
Technical summary rept.,
by M. Kawaguti, and Padam Jain. Sep 65, 52p. Rept. no. MRC-TSR-590,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Cylindrical bodies, Incompressible flow), (*Incompressible flow, Numerical analysis), Fluid flow, Reynolds number, Vortices, Pressure, Distribution, Drag, Equations of motion

A systematic numerical study of the unsteady viscous incompressible fluid flow past a circular cylinder is reported. The range of the Reynolds number considered is 1 to 100. The steady state solutions could be obtained at the Reynolds numbers R = 10, 20, 30, 40, 50 as the limit of the unsteady state solutions. The numerical results are compared with those for the steady problem and they are found to be in agreement. Dependency on the Reynolds number and the time of the flow pattern, vorticity distribution, pressure distribution and the drag are shown. (Author)

AD-630 534 Fld. 20/4, 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
APPLICATION OF A METHOD FOR APPROXIMATING EXTREMALS OF FUNCTIONALS TO COMPRESSIBLE FLUID FLOWS.
Technical summary rept.,
by Donald Greenspan, and Padam Jain. Jan 66, 47p. Rept. no. MRC-TSR-597,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Subsonic flow, Numerical analysis), (*Compressible flow, Numerical analysis), Complex variables, Equations of motion, Calculus of variations, Approximation (Mathematics), Functional analysis, Equations of state, Partial differential equations

A combination variational integral-finite difference technique for extremizing functionals numerically is applied to a fundamental, nonlinear subsonic flow problem. Not only is the flow pattern constructed, but estimates of the critical Mach number, speed, acceleration, and pressure are also obtained. The method is also applied to mark the emergence of a supersonic bubble in problems where this phenomenon occurs. (Author)

AD-630 544 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
A HIGHER ORDER THEORY FOR DEEP WATER WAVES.
Technical summary rept.,
by Peter L. Monkmeyer, and John E. Kutzbach. Feb 66, 37p. Rept. no. MRC-TSR-610,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Water waves, Hydrodynamics), (*Hydrodynamics, Water waves), Acoustics, Fluid mechanics, Algebra, Data processing systems, Digital computers

The classical problem of describing the characteristics of deep water waves of finite amplitude is considered. The method of analysis initially follows that of Nekrasov, but differs in that a nonlinear algebraic equation is derived. This equation is solved to the third, fifth and fifteenth order by means of a digital computer and the data is presented in tabular form. Expressions for the wave speed and wave shape, predicted by the analysis, are compared with the results obtained by Stokes. The highest wave in water is also discussed. (Author)

AD-630 557 Fld. 20/4
CFSTI Prices: HC $1.60 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
RESEARCH STUDIES CONDUCTED AT THE POLYTECHNIC INSTITUTE OF BROOKLYN AEROSPACE INSTITUTE,

Rept. for 1 Mar 64-30 Sep 65,
by Robert J. Cresci, and Martin H. Bloom. Oct 65, 14p. Rept. no. PIBAL-898,
Contract AF 49 (638)-1391,

Unclassified report

Descriptors: (*Slender bodies, Gas flow), (*Wake, Axially symmetric flow), Viscosity, Boundary layer, Three-dimensional flow, Aerodynamic heating, Skin friction, Reentry vehicles

The report presents a brief review of a series of studies performed in connection with the flow over slender configurations at high Mach numbers and low Reynolds numbers. Two particular problem areas were emphasized in this research; these are, the near wake of axisymmetric bodies and viscous-inviscid interactions that occur along the intersection of planar surfaces aligned with the stream. The results of both theoretical and experimental studies related thereto are presented. (Author)

AD-630 588 Fld. 20/4, 20/13
CFSTI Prices: HC $2.60 MF $0.50
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
TRANSPORT COEFFICIENTS FOR DENSE GASES,
by J. R. Dorfman. 1965, 24p. Contract AF-AFOSR-1015-66,
AFOSR 66-0334

Unclassified report

Prepared for presentation at Eastern Theoretical Physics Conference (4th), 26-27 Nov 65, New York State Univ., Stony Brook.

Descriptors: (*Transport properties, Gases), (*Gases, Transport properties), Density, Dynamics, Damping, Viscosity, Mathematical analysis, Series

A convergent theory for the density dependence of transport coefficients for a moderately dense gas is discussed. Since the terms in the original density expansion depend upon the dynamics of successively higher numbers of particles, one can classify the divergences that appear in terms of the associated dynamical events. The most divergent terms are always determined by sequences of binary collisions. The summation of the most divergent terms produces a collision damping which keep the interval between successive binary collisions to within a few mean free times. The resummed expression for the viscosity due to Kawasaki and Oppenheim was partially evaluated. One can say that terms proportional to n to the (d-1) power log n, where d is the number of dimensions, appear in the density expansion, however, the precise coefficients of the logarithm have not yet been established. (Author)

AD-630 589 Fld. 20/4
CFSTI Prices: HC $3.00 MF $0.75
MICHIGAN UNIV ANN ARBOR
CONCENTRATED VORTEX MOTIONS IN FLUIDS (ABSTRACTS OF PAPERS).
Final rept.,
by Wilbur C. Nelson. 1964, 86p. Contract AF-AFOSR-649-64, Proj. AF-9781, Task 978101, AFOSR 65-1563

Unclassified report

Presented at the International Union of Theoretical and Applied Mechanics Symposium, Michigan Univ., Ann Arbor, Jul 6-11, 1964.

Descriptors: (*Vortices, *Fluids), Abstracts, Symposia, Fluid mechanics, Gas flow, Fluid flow

AD-630 629 Fld. 20/4, 7/4
CFSTI Prices: HC $4.60 MF $0.50
AIX-MARSEILLE UNIV (FRANCE) INSTITUT DE MECANIQUE STATISTIQUE DE LA TURBULENCE
MACROSCOPIC EULERIAN DERIVATIVE OF A VOLUME INTEGRAL. ENTROPY OF A TURBULENT GAS. SOME SPECTRAL MEASUREMENTS OF SPACE -TIME CORRELATIONS.
Annual summary rept. no. 2,
by A. J. Favre, R. Dumas, and E. Verollet. Jan 66, 44p. Contract AF 61 (052)-772,
AFOSR 66-0614

Unclassified report

Descriptors: (*Fluid mechanics, *Thermodynamics), Turbulence, Entropy, Statistical mechanics, France

AD-630 630 Fld. 20/4, 22/1
CFSTI Prices: HC $2.00 MF $0.50
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
AERODYNAMIC FORCES ON A MODEL CONSTRUCTED FROM WIRE CLOTH IN LOW DENSITY HYPERSONIC FLOW,
by David E. Boylan. Apr 66, 28p. Rept. no. AEDC-TR-66-44,
Contract AF 40 (600)-1200, Proj. ARO-VL0642,

Unclassified report

Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Satellites (Artificial), Wind tunnel models), (*Wind tunnel models, Metallic textiles), (*Force (Mechanics), Hypersonic characteristics), Density, Feasibility studies, Drag, Porosity, Textiles, Tungsten, Stability, Angle of attack, Lift, Flight, Simulation, Nozzles, Wire

Measured aerodynamic forces on a satellite-type vehicle constructed from tungsten wire cloth are presented. The test medium was nitrogen, with a Mach number of 10. 15 and a Reynolds number of 388/in. The feasibility of using force models of this type is demonstrated. Because no other data on such a model are available to the author, no detailed comparison of aerodynamic features is offered. Drag coefficient at small angle of attack was found to be approximately the same as a roughly similar shape of nonporous construction, but corresponding lift coefficient slope was markedly reduced by the porosity. (Author)

AD-630 649 Fld. 20/4
CFSTI Prices: HC $1.60 MF $0.50
FELTMAN RESEARCH LABS PICATINNY ARSENAL DOVER N J
HIGH VELOCITY CUMULATIVE JETS.
Technical translation,
by N. P. Novikov. Apr 66, 15 p. Rept. no. TT-5, TT 66-61013

Unclassified report

Trans. of mono. Problemy Matematiki i Teoretichnoi Fiziki, 1962, p22-8.

Descriptors: (*Jets, Velocity), Spectroscopy, Liquid metals, Vacuum, High-pressure research, Thermodynamics, USSR

The report describes the obtaining of high-velocity cumulative jets, studies the structure of jets through photographic frames as well as their content by means of luminous spectra, deduces a number of relationships between the velocity of the high-velocity jets and various parameters, and, finally, attempts to examine the high-velocity and the basic cumulative jet as the outflow of a metal under high pressure into a vacuum. (Author)

AD-630 709 Fld. 20/4, 13/10
CFSTI Prices: HC $1.10 MF $0.50
SAINT ANTHONY FALLS HYDRAULIC LAB UNIV OF MINNESOTA MINNEAPOLIS
FLOW STUDIES ABOUT BODIES AT LOW CAVITATION NUMBERS.
Final rept.
Mar 66, 5p. Contract Nonr-710 (24), Proj. NR-062-052,

Unclassified report

Descriptors: (*Fluid flow, Cavitation), Reviews, Hydrofoils, Jets, Drag, Lift

A brief summary is given of previous research under the contract and the respective Technical Papers are cited.

AD-630 722 Fld. 20/4
PENNSYLVANIA STATE UNIV UNIVERSITY PARK
CURVED TURBULENT MIXING LAYER,
by D. P. Margolis, and J. L. Lumley. 24 Jun 65, 10p. Contract DA-ARO (D)-31-124-G196,

Unclassified report

Availability: Published in The Physics of Fluids v8 n10 p1775-84 Oct 1965. Copies to DDC users only.

Descriptors: (*Turbulence, *Curved profiles), Spectroscopy, Velocity, Pressure, Energy, Momentum, Fluid flow, Jet mixing flow, Scattering

The radial pressure gradient in combination with either a positive or negative radial gradient of angular momentum makes possible the realization of two dynamically different flows. When the angular momentum gradient is positive, the flow is stable; when it is negative, the flow is unstable. Mean velocity, turbulence intensity, and shear correlation measurements were made in both cases. The one-dimensional streamwise energy spectra of the lateral and transverse turbulent velocities were also measured. The turbulent energy balances for both cases reveal that the dominant terms are the production of turbulent energy and its spacial transport by the turbulent velocities. The effect of the centripetal acceleration field is to inhibit the spectral transport of turbulent energy in the unstable case. The dissipation rates are an order of magnitude greater than the dissipation rates in the unstable case. The one-dimensional streamwise energy spectra display a (-5/3) dependence almost two decades long in the unstable case and one decade long in the stable case. Furthermore, the spectra reveal that the constant in the Kolmogorov form of the spectrum is not universal and that it depends on the ratio of the rate of production to the rate of dissipation of turbulent energy. In this study this ratio ranged from 1.5-27, and the values of the Kolmogorov constant varied from 0.4-2.4.

AD-630 765 Fld. 20/4
CFSTI Prices: HC $9.60 MF $0.75
VIDYA DIV ITEK CORP PALO ALTO CALIF
CALCULATION OF LAMINAR SEPARATION WITH FREE INTERACTION BY THE METHOD OF INTEGRAL RELATIONS. PART II. TWO-DIMENSIONAL SUPERSONIC NONADIABATIC FLOW AND AXISYMMETRIC SUPERSONIC ADIABATIC AND NONADIABATIC FLOWS.
Rept. for May-Oct 65,
by Jack N. Nielsen, Larry L. Lynes, and Frederick K.Goodwin. Jan 66, 91p. Rept. no. Vidya-203,
Contract AF 33 (615)-1591, Proj. AF-8219, Task 821902,
AFFDL TR-65-107-Pt-2

Unclassified report

See also AD-626 160.

Descriptors: (*Flow separation, Mathematical analysis), (*Laminar boundary layer, Flow separation), (*Supersonic flow, Flow separation), Axially symmetric flow, Two-dimensional flow, Adiabatic gas flow, Velocity, Temperature, Pressure, Integrals

A alculative method is presented for determining separated, laminar, boundary-layer characteristics from in front of the separation point to the reattachment point under the influence of 'free interaction' between the main flow and the boundary

layer. The analysis covers supersonic flow over two-dimensional and axisymmetric configurations with adiabatic or nonadiabatic wall conditions. For nonadiabatic wall conditions, theories based on first-order coupling and second-order coupling between velocity and total temperature profiles were presented. The theory based on first-order coupling was included in a machine calculation program with options for two-dimensional or axisymmetric flow and adiabatic or nonadiabatic wall conditions. Extensive systematic calculations were made to determine the range of possible separated flows over a two-dimensional configuration as a function of separation point location and wall temperatures. Comparison between experiment and theory for separation pressure distributions on two -dimensional or axisymmetric adiabatic configurations shows generally good agreement. (Author)

AD-630 769 Fld. 20/4
CFSTI Prices: HC $1.60 MF $0.50
FELTMAN RESEARCH LABS PICATINNY ARSENAL DOVER N J
PROPAGATION OF A STRONG DISCONTINUITY IN AN INHOMOGENEOUS ATMOSPHERE.
Technical translation,
by E. I. Andriankin, A. M. Kogan, A. S. Kompaneiets, and V. P. Krainov. Apr 66, 16p. Rept. no. TT-6,
TT 66-60935
Unclassified report

Trans. of Zhurnal Prikladnoi Mekhaniki Tekhnicheskoi Fiziki (USSR) n6 p3-7 Nov-Dec 1962.

Descriptors: (*Shock waves, Propagation), Atmosphere, Fluid mechanics, Equations of motion, Energy, Momentum, Differential geometry, USSR

In this paper is presented a hydrodynamic calculation of a strong discontinuity in an inhomogeneous atmosphere. It is found that after a finite time the shock front diverges toward infinity. It is shown that, no matter how severe the discontinuity may be, no strong shock wave may be propagated below a distance greater than 16.5 km. The velocity and pressure in the propagating shock wave are determined as functions of time. Conversion formulas are given for various energies and heights of the discontinuity. The regions of validity of the formulas are indicated. (Author)

AD-630 772 Fld. 20/4
CFSTI Prices: HC $4.60 MF $0.50
CALIFORNIA UNIV BERKELEY DIV OF APPLIED MECHANICS
ON CONSTITUTIVE EQUATIONS FOR FLOW OF FLUID THROUGH AN ELASTIC SOLID.
Technical rept.,
by M. J. Crochet, and P. M. Naghdi. Jan 66, 42p. Rept. no. AM-66-2,
Contract Nonr-222 (69), Proj. NR-064-436,
Unclassified report

Descriptors: (*Fluid flow, *Equations of state), (*Solids, Fluid flow), Continuum mechanics, Elasticity, Thermodynamics, Nonlinear differential equations

Some thermodynamical aspects of a restricted class of nonlinear constitutive equations for a mixture of two continua are discussed. These results are then specialized and further developed for the flow of fluid through an elastic solid and are applicable to problems of flow in porous media. The linearized constitutive relations for porous media, together with a simple example, are also discussed. (Author)

AD-630 775 Fld. 20/4
CFSTI Prices: HC $12.60 MF $0.75
MASSACHUSETTS INST OF TECH CAMBRIDGE HYDRODYNAMICS LAB
NON-LINEAR STANDING WAVES IN A RECTANGULAR TANK DUE TO FORCED OSCILLATION.
Technical rept. for Oct 59-Oct 60,
by J. D. Lin, and L. N. Howard. Oct 60, 121p. Rept. no. TR-44,
Contract Nonr-1841 (12) ,Nonr-1841 (65)
Unclassified report

Descriptors: (*Tanks (Containers), Water waves), (*Water waves, Mathematical analysis), Two-dimensional flow, Oscillation, Rectangular bodies, Linear systems, Velocity, Frequency, Stability, Equations, Four analysis

The study is concerned with standing waves generated by a two-dimensional wave maker in a rectangular tank. The theoretical investigation was first based on the well -known linear theory of surface waves. The linearized version of the problem is basically two-dimensional and the solution of forced two-dimensional standing waves of small amplitude was obtained. Then, a system of equations, based on the exact free surface conditions, was derived for solutions of forced two-dimensional standing waves of finite amplitude. The frequency-amplitude curves for two constant amplitudes of wave maker were found to consist of two nonintersecting branches of oscillation; the range of significant non-linear effects was also determined for the particular mode. Two profiles of standing waves were computed for the frequencies on each branch of the oscillation. The stability of non-linear forced two-dimensional standing waves was studied by investigating the possibility of excitation of the fundamental mode of cross waves. (Author)

AD-630 780 Fld. 20/4
CFSTI Prices: HC $5.60 MF $0.75
DOUGLAS AIRCRAFT CO INC SANTA MONICA CALIF MISSILE AND SPACE SYSTEMS DIV
ON THE USE OF THE SHOCK LAYER APPROXIMATION IN THE INVERSE HYPERSONIC BLUNT BODY PROBLEM,
by H. K. Cheng, and G. A. Gaitatzes. Oct 65, 59p. Rept. no. SM-49268,
Unclassified report

Descriptors: (*Hypersonic flow, Blunt bodies), (*Shock waves, Hypersonic flow), (*Stagnation point, Hypersonic flow), Approximation (Mathematics), Pressure, Numerical analysis, Axially symmetric flow

The usefulness of the shock-layer approximation as a method of attack to the hypersonic blunt body problem is studied. Mainly the inverse problems of axisymmetric inviscid flow of a calorically perfect gas (in which the shock geometry is given) are discussed. Methods which are consistent with approximations based on a high shock compression ratio (but modified to take into account the contribution of the tangential pressure gradient and some other second order terms) are proposed. Good agreement in body shape and streamlines with other more exact (numerical) solutions is shown not only for specific heat ratios as high as gamma = 5/3 and 2, but also for stagnation regions of very blunt configurations, for which the standard shock-layer theory completely fails. Analytic forms of the pressure field, body and streamline geometries are developed for the sonic family shocks (of arbitrary degree of oblateness and eccentricity) in stagnation regions. (Author)

AD-630 799 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
POLITECNICO DI TORINO (ITALY) ISTITUTO DI MECCANICA APPLICATA
EXPERIMENTAL RESEARCH ON THE EFFECT OF PRESSURE GRADIENT AND FREE STREAM TURBULENCE ON THE BOUNDARY LAYER OF A FLAT ROUGH PLATE.
Technical note,
by Ennio Mattioli. Nov 65, 32p. Rept. no. TN-33,Scientific-9
Contract AF-EOAR-98-63,
AFOSR 66-0339
Unclassified report

Presented at the National Congress of AIDA (19th), Naples, Oct 25-28, 1965.

Descriptors: (*Boundary layer, Flat plate models), (*Turbulence, Boundary layer), (*Pressure, Boundary layer), Thickness, Surface properties, Walls, Italy, Roughness, Mathematical analysis

A determination was made of displacement thickness and momentum loss thickness in the boundary layer of a rough flat plate at low velocities, at various conditions of wall roughness, pressure gradient and free stream turbulence. The opportunity is discussed to assume y = zero at the 'top plane' of the rough surface, taking as additional parameter the flow velocity at the wall. New results are indicated about the slowing down of the stream near the wall, about the turbulence mainly initial effect, about the presence of a boundary layer above the boundary layer, as a consequence of the combined action of pressure gradient and free stream turbulence. (Author)

AD-630 867 Fld. 20/4
CFSTI Prices: HC $1.10 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
FORMATION OF THE FLOW UPSTREAM OF A SHOCK WAVE EXPELLED FROM A NOZZLE,
by A. I. Starshinov. 14 Mar 66, 6p. Rept. no. TG-230-T469,
Contract NOw-62-0604-c,
TT 66-60965
Unclassified report

Trans. of Leningrad Univ. Vestnik (USSR) n13 Seriya Matematiki, Mekhaniki i Astronomii n3 p125-7 1965.

Descriptors: (*Nozzle gas flow, Shock waves), (*Shock waves, Propagation), Axially symmetric flow, USSR

Theoretical investigations of the formation of the gas flow behind a shock wave expelled from a nozzle are presented. A method of calculation is given. (Author)

AD-630 868 Fld. 20/4
CFSTI Prices: HC $1.60 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
STUDY OF THE TRANSITION OF A TURBULENT BOUNDARY LAYER INTO A LAMINAR ONE,
by M. E. Deich, and L. Ya. Lazarev. 18 Mar 66, 13p. Rept. no. TG-230-T470,
Contract NOw-62-0604-c,
TT 66-60966
Unclassified report

Trans. of Inzhenerno-Fizicheskii Zhurnal (USSR) v7 n4 p18-24 1964.

Descriptors: (*Boundary layer transition, Transonic flow), (*Turbulent boundary layer, Boundary layer transition), Laminar flow, Laminar boundary layer, USSR

The results of an experimental study of the transition of a turbulent boundary layer into a laminar one at transonic velocities in various tunnels are presented. An approximate estimate is given of the effect of various factors on the nature of the turbulent-laminar transition in the boundary layer, as well as the conditions governing the initiation of such reverse transition. (Author)

AD-630 875 Fld. 20/4
CFSTI Prices: HC $2.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
SCALE EFFECT OF CAVITATION EROSION,
by K. K. Shalnev. 20 Jan 66, 23p. Rept. no. FTD-TT-65-1577,
TT 66-60968
Unclassified report

Unedited rough draft trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n4 p121-8 1962.

Descriptors: (*Erosion, *Cavitation), Scale, Fluid flow, USSR, Materials, Simulation

A description is given of the results of studying hydromechanical cavitation erosion beyond a model of circular profile in a plane-parallel flow. The studies were carried out in order to establish the scale effect of erosion.

AD-630 910 Fld. 20/4, 7/4
CFSTI Prices: HC $2.00 MF $0.50
YALE UNIV NEW HAVEN CONN DEPT OF ENGINEERING AND APPLIED SCIENCE
NON-EQUILIBRIUM NOZZLE FLOW WITH CONDENSATION.
Rept. no. 7,
by Peter P. Wegener, and Jean-Yves Parlange.
Mar 66, 34p. Contract Nonr-609 (47),
Unclassified report

Rept. on Experimental and Theoretical Study of Condensation and supercritical heat addition in Nozzle Flow. Prepared for presentation at the AGARD Colloquim on Recent Advances in Aerothermochemistry (7th), Oslo, Norway, 16-20 May 1966.

Descriptors: (*Nozzle gas flow, *Nonequilibrium flow), (*Condensation, Nozzle gas flow), Supersonic nozzles, Thermodynamics, Phase studies

Condensation of vapor and vapor-gas mixtures in supersonic nozzle flows is discussed. The limiting conditions of equilibrium and frozen flow, and the thermodynamics of the collapse of the supersaturated flow are demonstrated. New results are presented on the nature of the condensate produced by homogeneous nucleation of water vapor in inert air. It is deduced from experiments that the condensate is finely dispersed after equilibrium is attained. Study of these extremely small clusters may shed new light on nucleation theory, surface free energy and other aspects of phase transition at low temperature. (Author)

AD-630 960 Fld. 20/4
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MATHEMATICS
STABILITY OF A SHEAR FLOW IN AN UNSTABLE LAYER.
by Thomas J. Eisler. 10 Feb 65, 7p. Contract NsG-586,
Unclassified report

Availability: Published in The Physics of Fluids v8 n9 p1635-40 Sep 1965. Copies to DDC users only.

Descriptors: (*Fluid flow, Stability), Shear stresses, Numerical analysis, Perturbation theory, Equations

The stability with respect to small perturbations of a piecewise linear velocity profile of the half-jet (or shear layer) type in a layer with an unstable entropy gradient was studied. The maximum instabilities are found to be either in the plane of the velocity profile or perpendicular to it depending on a critical Richardson number which is quite insensitive to the depth of the layer. (Author)

AD-630 961 Fld. 20/4
CAMBRIDGE UNIV (ENGLAND) DEPT OF APPLIED MATHEMATICS AND THEORETICAL PHYSICS
A MECHANISM FOR INSTABILITY OF PLANE COUETTE FLOW AND OF POISEUILLE FLOW IN A PIPE.
by A. E. Gill. 28 Jul 64, 9p.
Unclassified report

Work sponsored by ONR.

Availability: Published in Journal of Fluid Mechanics v21 pt 3 p503-11 1965. Copies to DDC users only.

Descriptors: (*Fluid flow, *Pipes), Stability, Couette flow, Viscosity, Laminar flow, Great Britain

It is found that only a small change in either of the undisturbed velocity profiles concerned is required to change them from stable profiles to unstable profiles. The change must be such as to produce a local maximum in the magnitude of the vorticity, or in the case of the pipe, in the magnitude of the vorticity divided by the radius. The actual change in the vorticity (or vorticity/radius) need only be small, but the gradient of the vorticity (or vorticity/radius) must be finite. Viscosity will tend to damp out the distortion in the mean flow that is responsible for the instability, so that if the flow is to become turbulent, non-linear effects must become important before the distortion of the mean flow is reduced to an ineffective level. This requirement leads to the determination of critical Reynolds numbers which depend on the initial (small) distortion of the mean flow and the initial (smaller) amplitude of periodic disturbances. These critical Reynolds numbers are large. (Author)

AD-630 962 Fld. 20/4
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MATHEMATICS
INSTABILITIES OF 'TOP-HAT' JETS AND WAKES IN COMPRESSIBLE FLUIDS,
by A. E. Gill. 28 Aug 64, 3p.
Unclassified report

Work sponsored by ONR.

Availability: Published in The Physics of Fluids v8 n8 p1428-30 Aug 1965. Copies to DDC users only.

Descriptors: (*Compressible flow, Stability), (*Jets, Stability), (*Wake, Stability), Velocity, Two-dimensional flow, Subsonic flow, Supersonic flow, Mathematical analysis

The stability of jets or wakes in a compressible fluid is examined for the case of 'top-hat' velocity profiles, where the jet or wake is a region of uniform velocity separated on either side from the external uniform flow by a vortex sheet. In both the two-dimensional and axisymmetric cases, these jets or wakes are unstable at all Mach numbers to disturbances of all nonzero wavenumbers. For subsonic flows and for disturbances to supersonic flows of sufficiently small wavenumbers, there are only a few unstable modes (one for each symmetry in the two-dimensional case and one for each azimuthal Fourier component in the axisymmetric case), but for sufficiently rapid flows and for distrubances whose wavenumber is not too small, there are a large number of unstable modes. These are made possible by the transfer of energy across the jet or wake by sound waves, and the different modes correspond to the different numbers of waves that it is possible to 'fit in.' There is an enhanced instability when the sound waves within a top-hat jet or wake reflect at certain resonant angles. (Author)

AD-630 969 Fld. 20/4
CFSTI Prices: HC $2.60 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ENGINEERING JOURNAL (SELECTED ARTICLES).
21 Jan 66, 30p. Rept. no. FTD-TT-65-1785, TT 66-60985
Unclassified report

Unedited rough draft trans. of Inzhenernyi Zhurnal (USSR) v5 n3 p416-24, 548-53 1965.

Descriptors: (*Hypersonic flow, *Aerodynamic configurations), Conical bodies, Blunt bodies, Viscosity, USSR, Boundary layer, Mathematical analysis, Thermodynamics

Contents: Flow around thin pointed cones of a viscous hypersonic gas flow; Calculation of flow near a critical point of a blunted body with consideration of study.

AD-631 006 Fld. 20/4, 20/9
CFSTI Prices: HC $2.60 MF $0.50
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICS
ELECTRON DENSITY AND IONIZATION PHENOMENA IN SHOCK WAVES.
Annual summary rept.,
by W. Low. 23 Nov 65, 21p. Contract AF 61 (052)-846,
AFOSR 66-0634
Unclassified report

Descriptors: (*Shock waves, Measurement), Gas ionization, Electron density, Taper, Nozzles, Optical properties, Shock tubes, Probes (Electromagnetic), Gas flow, Israel

A new shock-tube suitable for microwave and optical measurements was designed and manufactured. It was established that the Mach speed behind a taper section ending in an area change is close to that predicted by the steady state theory, provided measurements are made far enough downstreams, and provided viscous corrections are being made. However, near the transition section, large deviations from the values predicted either by the steady state or linear theory are found. Within 20-50 nozzle lengths there are fluctuations in the Mach speed which are only damped out far enough downstreams. For the inverse problem of a shock flow into an expanding constriction yielding a larger area, one also finds that the Mach speed far enough downstreams approximates the steady state theory. However, near the transition section the fluctuations are not as violent. The optical data show a peculiar intensity dependence on the position behind the shock front.

AD-631 070 Fld. 20/4, 20/9, 20/11, 20/8, +
CFSTI Prices: HC $1.10 MF $0.50
CALIFORNIA UNIV SAN DIEGO LA JOLLA INST FOR RADIATION PHYSICS AND AERODYNAMICS
RESEARCH IN RADIATION PHYSICS AND AERODYNAMICS.
Semiannual technical summary rept. for 30 Mar 66,
by Keith A. Brueckner. 30 Mar 66, 8p. Contract DA-31-124-ARO (D)-257 ,RPA Order-570
Unclassified report

Descriptors: (*Physics, Scientific research), (*Mechanics, Scientific research), (*Aerodynamics, Scientific research), (*Numerical analysis, Scientific research), Atomic properties, Molecular properties, Lasers, Gas flow, Fluid mechanics, Plasma physics, Structures

Abstracts are presented of technical papers on the following subjects: atomic and molecular physics, laser beam interactions, high temperature gas dynamics, solid mechanics and structures, fluid mechanics, plasma physics and diagnostics, numerical analysis and applied mathematics.

AD-631 101 Fld. 20/4
POLITECNICO DI TORINO (ITALY) ISTITUTO DI MECCANICA APPLICATA
FREE MOLECULE SURFACE SOURCES AND SINKS AND APPLICATIONS. PART I.
Technical note (scientific),
by Silvio Nocilla. Apr 65, 22p. Rept. no. Scientific-3,TN-27
Contract AF-EOAR-98-63,
AFOSR 66-0120
Unclassified report

Availability: Published in Laboratorio di Meccanica Applicata del Politecnico di Torino (Italy) TN-27 Apr 1965. Copies to DDC users only.

Descriptors: (*Supersonic aerodynamics, *Kinetic theory), Distribution functions, Temperature, Gases, Molecules, Italy, Surfaces, Sources

A discussion is given of the concept of free molecule sources and sinks, characterised by an elementary surface in the space with oriented normal, by their temperature and by the distribution function of the molecules which respectively start from or impinge on them. This concept is an extension of the basic concepts of the Maxwellian kinetic theory of gases and it has application in the study of the interaction between stream and body in free molecule flow. (Author)

AD-631 121 Fld. 20/4
CFSTI Prices: HC $5.60 MF $0.50
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
CNOIDAL WAVES IN A TOROIDAL CHANNEL.
Technical rept.,
by A. S. Peters. Feb 66, 54p. Rept. no. IMM-347,
Contract Nonr-285 (55), Proj. NR-062-160,

Unclassified report

Descriptors: (*Mechanical waves, Mathematical analysis), (*Fluid flow, Mechanical waves), Liquids, Gases, Gas flow, Water waves, Mechanics, Dynamics

The report is concerned with cnoidal waves in a liquid or gaseous ocean confined to a channel along a parallel of latitude on a sphere. (Author)

AD-631 135 Fld. 20/4
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF AERONAUTICS AND ASTRONAUTICS
STABILITY OF A PANEL IN INCOMPRESSIBLE, UNSTEADY FLOW.
Revised ed.,
by R. E. Kelly. 25 Feb 65, 7p. Contract AF-AFOSR-156-63,
AFOSR 66-0330

Unclassified report

Revision of manuscript received 31 Jul 64.

Availability: Published in AIAA Journal v3 n6 p1113-8 1965. Copies to DDC users only.

Descriptors: (*Panels (Structural), Stability), (*Aerodynamic characteristic, Panels (Structural)), Incompressible flow, Oscillation, Membranes, Turbulence

The stability of an infinite panel is investigated when the panel is immersed in an airstream whose velocity is composed in part of an unsteady component that oscillates periodically with respect to time. The analysis indicates that neutrally stable waves in the panel can undergo parametric amplification due to the flow oscillation and therefore grow exponentially with time. It is also shown that the unsteadiness has a destabilizing effect on the mode of instability which is a result of dissipation in the panel. Finally, the possibility of stabilizing a membrane in a steady flow by varying its tension periodically with respect to time is discussed. (Author)

AD-631 136 Fld. 20/4
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF AERONAUTICS AND ASTRONAUTICS
THE STABILITY OF AN UNSTEADY KELVIN-HELMHOLTZ FLOW.
Revised ed.,
by R. E. Kelly. 3 Dec 64, 15p. Contract AF-AFOSR-156-63,
AFOSR 66-0329

Unclassified report

Revision of manuscript received 29 Jul 64.

Availability: Published in J. Fluid Mech. v22 p13 p547-60 1965. Copies to DDC users only.

Descriptors: (*Fluid flow, Stability), (*Boundary layer, Stability), Oscillation, Shear stresses, Turbulence, Equations of motion, Mathematical analysis

The investigation concerns the stability of an interface between two inviscid fluids of different densities which flow parallel to each other in an oscillatory manner. When the difference in the mean speeds is below the steady, critical speed for instability but is large compared to the amplitude of the fluctuations, parametric amplification of waves at the interface occurs, and the interface exhibits a resonance of a subharmonic nature. The paper concludes with a discussion of the stability of unsteady shear layers on the basis of the results. (Author)

AD-631 149 Fld. 20/4
CFSTI Prices: HC $2.00 MF $0.50
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
EQUATIONS AND CHARTS FOR THE EVALUATION OF FORCES ON SPHERICALLY BLUNTED CONES BY THE NEWTONIAN THEORY,
by L. L. Trimmer. Apr 66, 41p. Rept. no. AEDC-TR-66-16,
Contract AF 40 (600)-1200, Proj. ARO-VT3116,

Unclassified report

Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Conical bodies, *Hypersonic characteristics), (*Aerodynamic loading, Conical bodies), Graphics, Equations, Blunt bodies, Spheres, Mathematical analysis

Equations and charts are presented for the determination of the aerodynamic forces and moments of spherically blunted cones in hypersonic flow by the modified Newtonian theory. The equations are valid for cone half-angles from 0 to 90 deg and angles of attack from 0 to 180 deg; charts are presented for cone half-angles from 5 to 40 deg and angles of attack from 0 to 90 deg. A comparison of Newtonian theory predictions with experimental data is presented. (Author)

AD-631 156 Fld. 20/4
MASSACHUSETTS INST OF TECH CAMBRIDGE
ON THE TORSIONAL OSCILLATIONS OF A PLANE WITH LARGE SUCTION,
by R. E. Kelly. 4 Jan 65, 5p. Contract AF-AFOSR-156-64,
AFOSR 66-0328

Unclassified report

Prepared in cooperation with National Physical Lab., Teddington (England). Aero Div.

Availability: Published in Journal of Applied Mathematics and Physics (ZAMP) v16 Fasc4 p516-9 1965. Copies to DDC users only.

Descriptors: (*Disks, *Suction slots), (*Fluid mechanics, Disks), Oscillation, Torsion, Mathematical analysis

It is well known that torsional oscillations of a disk induce an axial flow towards the surface of the disk. Due to centrifugal effects, this flow is composed of a steady as well as an unsteady component. This note concerns how suction applied at the disk surface affects the magnitude of this steady inflow.

AD-631 157 Fld. 20/4
MASSACHUSETTS INST OF TECH CAMBRIDGE
THE RESISTANCE ON A CIRCULAR CYLINDER IN AN OSCILLATING STREAM.
Revised ed.,
by Chung-Yi Wang. 16 Mar 65, 10p. Contract AF-AFOSR-156-64,
AFOSR 66-0623

Unclassified report

Revision of manuscript submitted 22 Sep 64.

Availability: Published in Quarterly of Applied Mathematics v23 n4 p305-12 Jan 1966. Copies to DDC users only.

Descriptors: (*Fluid dynamic properties, Cylindrical bodies), Equations of motion

The boundary layer equations, formulated in cylindrical polar coordinates, are applied to a circular cylinder in a slightly viscous stream which is oscillating with a high reduced frequency. The resistance is correctly calculated to the second order. The first order part, 45 degrees out of phase, is due to the interaction of viscosity with acceleration. The second order part, -90 degrees out of phase, is due to the interaction of viscosity with curvature. The interaction of viscosity with inertia, which is of second order also, contributes no resistance. (Author)

AD-631 177 Fld. 20/4
CFSTI Prices: HC $4.60 MF $0.50
PRINCETON UNIV N J GAS DYNAMICS LAB
INCOMPRESSIBLE CAVITY FLOWS IN TWO DIMENSIONS AT LOW REYNOLDS NUMBER,
by Henrik J. Hagerup. Jun 64, 42p. Rept. no. 691,
Contract AF 49 (638)-1271,
AFOSR 65-0058

Unclassified report

Descriptors: (*Incompressible flow, *Flow separation), Two-dimensional flow, Reynolds number, Aerodynamic configurations, Shear stresses, Mathematical analysis

Linearized solutions for simple shear flow past wave-shaped walls are superposed to yield recirculatory flow patterns for a series of shallow cavities with slope discontinuities at the ends. (Author)

AD-630 632 See Fld. 20/9

AD-630 665 See Fld. 7/4

AD-630 677 See Fld. 20/9

AD-630 682 See Fld. 20/1

AD-630 684 See Fld. 20/1

AD-630 745 See Fld. 12/1

AD-630 763 See Fld. 13/7

AD-630 826 See Fld. 21/5

AD-630 924 See Fld. 1/1

AD-631 004 See Fld. 13/11

AD-631 007 See Fld. 20/13

AD-631 014 See Fld. 8/3

AD-631 016 See Fld. 20/1

AD-631 065 See Fld. 14/2

AD-631 103 See Fld. 19/4

AD-631 129 See Fld. 7/4

AD-631 162 See Fld. 3/2

20/5. MASERS AND LASERS

AD-630 608 Fld. 20/5, 20/6
CFSTI Prices: HC $4.60 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

THERMALLY INDUCED EFFECTS IN SOLID STATE LASER RODS.
Physical sciences research papers,
by Richard Lee Townsend,Jr.. Jan 66, 45p.
Rept. no. AFCRL-PSRP-188,AFCRL-66-57
Proj. AF-4645, Task 464502,
Unclassified report

Descriptors: (*Lasers, Thermal properties), (*Ruby, Thermal expansion), (*Neodymium, Thermal expansion), Optical properties, Deformation, Pumping (Optical), Excitation, Heating, Coolants, Interferometers, Thermal conductivity, Glass, Lenses

An experiment was performed to measure changes in optical length of ruby and neodymium in glass laser rods both during and after excitation by the pump flash. A Twyman-Green interferometer was used to produce fringes, the fringe movement being correlated with changes in optical length. Movement and distortion of fringes was observed using a multiframe image converter camera. The results show that all rods expand linearly with time during the time the pump is on and that all rods develop a distortion which is dependent on the radial energy density distribution within the rod. After the pump goes off, the rods being a relaxation back to the unexcited state. The relaxation is interrupted when hot air propagates from the flash tube to the rod causing the rod to reheat and causing an extremely concave appearance. The rods then relax slowly to an equilibrium state with ruby reaching this state in much shorter times (0.4 sec) than glass due to its higher thermal conductivity. These results stress the importance of uniform pumping if low beam divergence is to be achieved. Immersion of the rod in an index-matching infrared-absorbing fluid would be desirable not only to pump the laser uniformly but also to shield it from the infrared radiation which causes concave distortions after 20 msec. (Author)

AD-630 933 Fld. 20/5, 20/6
CFSTI Prices: HC $4.60 MF $0.50
AMERICAN OPTICAL CO SOUTHBRIDGE MASS RESEARCH DIV
OPTICAL INHOMOGENEITIES IN PUMPED LASERS.
Semi-annual technical rept. no. 1, 22 Jun-31 Dec 65,
by Charles J. Koester. Mar 66, 44p. Rept. no. RD-601-580,
Contract Nonr-4875 (00),ARPA Order-306 Proj. 4730,
Unclassified report

Descriptors: (*Lasers, Thermal stability), Glass, Rods, Thermal stresses, Light, Distortion, Optics, Solid state physics

This report delineates progress made during the analysis in depth of thermal distortion of wavefronts in large laser rods. Included is an Introduction and Summary which briefly describes the problem, the program, results to date and future direction of effort. A review of previous work by American Optical Company and others is given. In separate sections, Thermally Stable Cavities, Temperature Profiles and Index Changes are treated. Finally a mathematical study of End Region Stress Analysis is presented. (Author)

AD-630 953 Fld. 20/5
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF RESEARCH LABS
THEORY OF DOUBLE RESONANCE IN GASEOUS LASERS,
by W. Culshaw. 14 Jun 65, 13p.
Unclassified report

Availability: Published in The Physical Review v142 n1 p204-16 Feb 4 1966. Copies to DDC users only.

Descriptors: (*Lasers, Resonance), (*Atomic energy levels, Lasers), (*Radiofrequency pulses, Lasers), Electron transitions, Hamiltonian, Perturbation theory, Polarization, Intensity, Line spectrum, Theory

The simultaneous action of a rf perturbation between the Zeeman sublevels of an atomic transition, which is also producing laser oscillation, is considered. The complete Hamiltonian of the system is made time-independent by appropriate unitary transformations, and the corresponding steady-state solutions of the density matrix are deduced using appropriate rate constants. Results for stationary atoms indicate a dependence of the threshold for oscillation on the rf perturbation, together with rf resonance effects which increase the laser intensity some two or three times for suitable transitions. The increase in intensity is greatest for rf perturbations between the upper Zeeman levels, which also have the smaller resonance width, because of the longer lifetimes involved. Such effects will be small unless there is a reasonable difference in the populations of the Zeeman levels in the absence of the rf perturbation. Appropriate laser transitions, cavity tuning, and polarization characteristics must thus be used to obtain maximum effect, and examples are given. The atomic motion is included in the theory in an approximate way, and similar conclusions are derived as regards the variations of laser intensity. However, no dependence of the threshold on the rf perturbation is then indicated, the former being determined by the relatively large Doppler width. Finally, some consideration is given to cases where more than one laser transition occurs between the Zeeman levels. (Author)

AD-630 968 Fld. 20/5
MICROWAVE LAB STANFORD UNIV CALIF
EFFECT OF ULTRAVIOLET PUMPING ON RUBY LASER OUTPUT,
by R. L. Greene, J. L. Emmett, and A. L. Schawlow. 19 Oct 65, 3p. Rept. no. ML-1417,
Unclassified report

Supported in part by U. S. Air Force and Navy Dept.

Availability: Published in Applied Optics v5 n2 p350-1 Feb 1966. Copies to DDC users only.

Descriptors: (*Lasers, Pumping (Optical)), (*Pumping (Optical), Ultraviolet radiation), Ruby, Optical properties, Optical filters, Quartz, Glass, Copper compounds, Sulfates

Two experiments were performed to evaluate the effects of ultraviolet radiation in laser pumping. In one, the ruby rod was pumped when surrounded by a quartz sheath, a Pyrex sheath, then no sheath. The quartz sheath transmits pumping radiation down to 2000 A while the Pyrex sheath absorbs all radiation below 3000 A. The longer wavelengths are transmitted equally well by both sheaths. The output with the quartz sheath is 30% to 40% less than that with the Pyrex sheath. In the second experiment the ruby rod was pumped while surrounded first with a filter of distilled water and then with a filter of CuSO4 solution. The CuSO4 concentration was adjusted so that the transmission between 3500 A and 5000 A matched that of the water. The output was lower for the CuSO4 filter at low-pumping levels (100 J), but gave a 15% greater output at higher pumping levels (300 J). Both led to the conclusion that intense ultraviolet pump light is detrimental to ruby laser output. (Extracted)

AD-631 039 Fld. 20/5, 20/6
CFSTI Prices: HC $1.00 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE
STUDY OF VARIOUS ASPECTS OF RAMAN SCATTERING USING C. W. OPTICAL MASERS.
Semiannual technical summary rept. no. 1, 1 Aug 65-1 Feb 66,
by A. Javan. 25 Mar 66, 9p. Rept. no. BSR-4979,
Contract Nonr-3963 (22) ,ARPA Order-306
Unclassified report

Descriptors: (*Lasers, *Raman spectroscopy), Spectrum analyzers, Design, Scattering, Line spectrum, Absorption spectrum, Photons, Gases, Liquids

Contents: Linewidth of Raman scattering, by J. R. Murray, A. P. Sheng, J. D. Ducuing; Stimulated Raman absorption in liquids, by J. R. Murray, A. P. Sheng, J. D. Ducuing; Two photon absorption processes, by J. R. Murray, A. P. Sheng, A. Javan; Raman scattering in gases-linewidth phenomena, by J. R. Murray, A. P. Sheng, A. Javan.

AD-631 033 See Fld. 20/6

AD-631 041 See Fld. 20/2

AD-631 070 See Fld. 20/4

AD-631 168 See Fld. 17/2

20/6. OPTICS

AD-630 590 Fld. 20/6, 9/4, 6/4
CFSTI Prices: HC $2.00 MF $0.50
UTAH STATE UNIV LOGAN ELECTRO-DYNAMICS LABS
THE EFFECTS OF DIFFRACTION ON OPTICAL DISCRIMINATION,
by C. K. Rushforth, and R. W. Harris. 1 Jan 66, 34p. Rept. no. Scientific-4,
Contract AF 19 (628)-3825,ARPA Order-450
Proj. AF-8663,
AFCRL 66-105
Unclassified report

See also AD-614 272.

Descriptors: (*Optical images, *Pattern recognition), (*Information theory, Pattern recognition), Signal-to -noise ratio, Optics, Diffraction, Statistical analysis

This report deals with the effects of diffraction and noise on the ability of an optical system to discriminate between two known incoherent intensity distributions. For a particular model of the optical detection process, the optimum discrimination procedure is derived using the techniques of statistical decision theory. Under the assumption of high background intensity, this optimum procedure simplifies considerably; and it is this simplified procedure we evaluate. In addition, we consider a reasonable sub-optimum procedure which does not require detailed knowledge of the diffraction pattern. It is shown that a useful performance criterion is the integrated square of the difference between the two diffracted intensity patterns under consideration. This quantity is evaluated numerically as a function of aperture size for various situations. Typically, it is seen that ability to discriminate drops off quite rapidly as the size of the Airy disc approaches the size of the objects (referred to the image plane). (Author)

AD-630 603 Fld. 20/6, 4/1, 8/12
CFSTI Prices: HC $3.00 MF $0.50
MICHIGAN UNIV ANN ARBOR
VISUAL RESOLUTION AND OPTICAL SCINTILLATION OVER SNOW, ICE AND FROZEN GROUND, PART II.
Research rept.,
by Donald J. Portman, Edward Ryznar, and Floyd C. Elder. Oct 65, 52p. Contract DA-11-190-eng-78, Task DA-1V014501B52A31,
CRREL RR-111-Pt-2
Unclassified report

Descriptors: (*Atmosphere, Optical properties), (*Optics, Atmosphere), (*Microeteorology, Light transmission), Snow, Ice, Permafrost, Electromagnetic wave reflections, Light, Scintillation, Vision, Resolution, Photometer

Data obtained over various surfaces were analyzed to determine relationships between visual

resolution and meteorological conditions and scintillation (intensity and frequency) and meteorological and surface conditions. The principal results obtained over snow and frozen ground showed that visual resolution, for turbulent flow in stable stratification, (1) deteriorated systematically as the vertical temperature gradient increased, (2) deteriorated with clear skies as the wind speed increased up to about 5 mph and then improved at higher wind speeds, and (3) was optimum and nearly independent of wind speed during low overcast cloudiness. Over a snow-free ice surface and with air temperatures below freezing, only minor scintillation was observed. The scintillation data obtained over ice are interpreted with regard to wind and temperature above the ice and to the heat conducted upward through the ice. A photographic method to measure resolution is described and some results are presented. Power spectra of scintillation over different surfaces are shown and discussed in relation to various meteorological parameters. These and other relations are discussed and equipment and measurement procedures are described. (Author)

AD-630 824 Fld. 20/6, 7/2
CFSTI Prices: HC $1.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
OPTICAL PROPERTIES OF MERCURY SULFIDE,
by B. F. Bilenkii, M. V. Pashkovskii, A. E. Nosenko, and Z. G. Grechukh. 7 Mar 66, 9p. Rept. no. TG-230-T463,
Contract NOw-62-0604-c,
TT 66-60937

Unclassified report

Trans. of Ukrayinskyi Fizychnyi Zhurnal (USSR) v8 n8 p913-5 1963.

Descriptors: (*Mercury compounds, Optical properties), Sulfides, Absorption spectrum, Continuous spectrum, Crystals, Impurities, Copper, Iodine, USSR

An arrangement for studying the optical properties of microcrystals is described. The absorption and reflection spectra of synthetic mercury sulfide crystals were obtained in the characteristic absorption region. The absorption edge of alpha-HgS free of impurities was observed at 610-millimicrons. A 575-millimicron band was detected in the absorption spectrum and a 600-millimicron band in the reflection spectrum. A photograph was taken of the diffuse reflection spectrum of powdered mercury sulfide samples obtained by grinding single crystals. The width of the forbidden zone of alpha-HgS was determined from the diffuse reflection spectrum and is 2.10 ev. A study was made of the influence of iodine and copper impurities, in various concentrations, on the diffuse reflection spectrum of mercury sulfide. (Author)

AD-631 015 Fld. 20/6
CFSTI Prices: HC $14.60 MF $1.00
RAND CORP SANTA MONICA CALIF
NUMERICAL RESULTS FOR INTERNAL INTENSITIES IN ATMOSPHERES ILLUMINATED BY ISOTROPIC SOURCES,
by H. H. Kagiwada, and R. E. Kalaba. Apr 66, 144p. Rept. no. RM-4958-PR,
Contract AF 49 (638)-1700,

Unclassified report

Descriptors: (*Optics, *Atmosphere), Light, Absorption, Scattering, Numerical analysis, Digital computers, Electromagnetic waves, Waves transmission, Tables

The b and h functions are introduced as internal intensities in finite homogeneous slabs due to isotropic sources of energy at the top and the bottom of the slabs, respectively. The slabs absorb and isotropically scatter radiation. The b and h functions are of interest in themselves, and are also important in the determination of internal fields due either to parallel rays of incident radiation or arbitary internal emitting sources. The b and h functions are computationally produced as solutions of stable initial value problems. The thickness of the slab is the independent variable, while the optical altitude above the bottom and the direction of propagation are fixed parameters. Extensive tables of these functions are presented for albedos of single scattering ranging from 0.1 to 1.0, for a range of optical thicknesses and depths, and for fifteen directions of propagation. The FORTRAN computer program which produced these tables is presented. (Author)

AD-631 033 Fld. 20/6, 20/5
CFSTI Prices: HC $1.00 MF $0.50
SCRIPPS INSTITUTION OF OCEANOGRAPHY SAN DIEGO CALIF VISIBILITY LAB
UNDERWATER OPTICS.
Letter rept.,
by S. Q. Duntley. 12 Mar 66, 25p. Contract Nonr-2216 (14)

Unclassified report

Descriptors: (*Underwater light, *Lasers), (*Light transmission, Underwater), Optics, Graphics

Data taken in 1965 confirm previous measurements made with a conventional light source in 1962 and with a laser source in 1964. The data continue to indicate a difference in the propagation characteristics of the two sources. This difference is ascribed to the different beam geometries, but it disappears when an integrating sphere with a 4 inch aperture is used for a receiver and a beam compression device is employed. Thus the laser and conventional sources have similar gross propagation properties although the data still indicate the presence of scattering effects. Thus the range of underwater laser devices may be longer than anticipated. The data also indicate that appreciable portions of the irradiance is far from the axis. (Author)

AD-630 608 **See Fld. 20/5**

AD-630 874 **See Fld. 20/3**

AD-630 913 **See Fld. 11/9**

AD-630 933 **See Fld. 20/5**

AD-631 039 **See Fld. 20/5**

AD-631 041 **See Fld. 20/2**

AD-631 045 **See Fld. 3/1**

AD-631 048 **See Fld. 4/1**

AD-631 188 **See Fld. 9/1**

20/8. PARTICLE PHYSICS

AD-630 519 Fld. 20/8
CAVENDISH LAB UNIV OF CAMBRIDGE (ENGLAND)
SINGULARITIES AND DISCONTINUITIES OF THE TRIANGLE GRAPH, AS A FUNCTION OF AN INTERNAL MASS,
by I. J. R. Aitchison, and C. Kacser. 3 Jun 65, 15p. Contract AF-EOAR-79-63,
AFOSR 66-0482

Unclassified report

Prepared in cooperation with Maryland Univ., College Park. Dept. of Physics and Astronomy, Grant NSF-GP-3221.

Availability: Published in Il Nuovo Cimento v40 (SX) p576-88 21 Nov 1965. Copies to DDC users only.

Descriptors: (*N-body problem, *Nuclear reactions), Decay schemes, Pair production, Integral equations, Graphics, Great Britain

The triangle graph for three-body production or decay processes is considered as a function of an internal mass. The discontinuities of the graph with respect to this variable are of special importance, since they form the kernel of the integral equation which determines all rescattering effects due to competing two-body final-state interactions. The main part of the kernel is given by one particular discontinuity, and this is recalculated by dispersion methods which are basically well understood. The results agrees with that previously found by the use of Cutkosky's rules supplemented by some techniques of homology theory. It is gratifying that the result can be obtained by relatively straightforward methods; and that Cutkosky's rules can indeed be used for calculating the discontinuity in an internal mass variable. A byproduct of the calculation is a prescription for calculating the discontinuity of the graph in a given channel from a single-variable representation of it in a crossed channel. Applications to three-particle processes are mentioned. (Author)

AD-630 520 Fld. 20/8
SAO PAULO UNIV (BRAZIL). LABORATORIO DO ACELERADOR ELETROSTATICO
ABSOLUTE CROSS SECTION MEASUREMENTS FOR THE REACTIONS NE20 (D,N)NA21 G.S. AND NE20 (D,N)NA21 (0.34 MEV),
by E. Farrelly Pessoa, R. L. Dangle, N. Ueta, and O. Sala. 15 Jan 65, 17p. Contract AF-AFOSR-310-63,
AFOSR 66-0445

Unclassified report

Availability: Published in Nuclear Physics v68 p337-51 1965. Copies to DDC users only.

Descriptors: (*Neon, Deuteron bombardment), (*Deuteron cross sections, Measurement), (*Nuclear cross sections, Deuteron reactions), Neutrons, Sodium, Radioactive isotopes, Excitation, Resonance, Nuclear reactions, Brazil

Absolute cross sections for the reactions Ne20 (d,n)Na21 g.s. and Ne20 (d,n)Na21 (0.34 MeV) were measured in the range of incident particle energies from 1.3 to 2.3 MeV. A phenomenological analysis was applied to the total cross section for the Ne20 (d,n)Na21 (0.34 MeV) reaction to separate the direct interaction contribution from the resonant state formation. The direct interaction contribution turns out to be very small indicating that the predominant reaction mechanism is a resonant type process. (Author)

AD-630 580 Fld. 20/8, 7/4
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF PHYSICS
LITHIUM-LITHIUM SCATTERING,
by L. L. Pinsonneault, and J. M. Blair. 3 Sep 65, 5p.

Unclassified report

Availability: Pulished in The Physical Review v141 n3 p961-5 Jan 1966. Copies to DDC users only.

Descriptors: (*Ion beams, Lithium), (*Lithium, *Elastic scattering), Nuclear cross sections, Stable isotopes

Elastic-scattering experiments have been performed with Li6 on Li6 from 3.2 to 7.0 MeV and with Li7 on Li7 from 4.0 to 6.5 MeV. In the lower portion of this energy range the observations follow Mott's scattering formula but at higher energies fall below these predictions. An analysis of the data in terms of the rounded-cutoff Blair model resulted in a set of parameters which was not sharply defined and probably not unique but which gave curves which reproduced satisfactorily the fluctuations of cross section with angle. An analysis in terms of one parameter, the interaction distance, gave values of r = (1.38 plus or minus 0.03) x 0.001 cm for Li6 and r = (1.52 plus or minus 0.03) x 10 to the -13th power cm for Li7. (Author)

AD-630 583 Fld. 20/8, 20/10
COLORADO UNIV BOULDER DEPT OF PHYSICS
COMPLEX LORENTZ GROUP WITH A REAL METRIC: GROUP STRUCTURE.
Revised ed.,
by A. O. Barut. 21 May 64, 7p. Contract AF-AFOSR-30-63,
AFOSR 66-0459
Unclassified report

Revision of manuscript received 3 Mar 64. Supported in part by NSF. Prepared in cooperation with National Bureau of Standards, Boulder, Colo.

Availability: Published in Journal of Mathematical Physics v5 n11 p1652-6 Nov 1964. Copies to DDC users only.

Descriptors: (*Groups (Mathematics), Field theory), (*Elementary particles, Quantum mechanics), Invariance, Matrix algebra, Algebras

In the attempts to connect the Lorentz group and the internal symmetry group of fundamental particles, a 16-parameter connected, noncompact group of rank 4 is studied in detail. The subgroup structure, Lie algebra and its complex extension (which is A3 in Cartan's notation), little groups, the inhomogeneous groups, and the group invariants are discussed. (Author)

AD-630 602 Fld. 20/8
CFSTI Prices: HC $5.60 MF $0.50
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO
THE MEASUREMENTS OF E/M, AN ANNOTATED BIBLIOGRAPHY.
Technical rept.,
by Tibor Vincze. May 60, 53p. Rept. no. TR-60-3,
Unclassified report

Descriptors: (*Electrons, Physical properties), Bibliographies, Electrostatics, Measurement, Reviews, Electron beams

A historical review is presented of literature from 1897 to 1957.

AD-630 624 Fld. 20/8
CFSTI Prices: HC $25.60 MF $1.25
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
ELASTIC SCATTERING OF HIGH ENERGY ELECTRONS FROM DEUTERIUM.
Technical rept.,
by Edwin Francis Erickson. Dec 65, 260p.
Rept. no. HEPL-423,
Contract Nonr-225 (67),
Unclassified report

Descriptors: (*Deuterium reactions, Electrons), (*Electrons, Deuterium reactions), (*Elastic scattering, Electrons), Deuteron cross sections, Nuclear properties, Magnetic properties, Theory, Nuclear structure, Mechanics, Nuclear reactions, Photons, Mesons, Deuterium

The purposes of the present work are: (1) To investigate the method of elastic electron-deuteron scattering by detection of the recoil target nucleus. (2) To evaluate existing theory for the scattering process in light of the recent advances in understanding nucleon structure and the nuclear force. (3) To provide experimental data at values of the momentum transfer where none had previously existed. Some fundamental preliminary considerations are discussed in Chapter II. Chapter III contains a summary of theoretical aspects of the problem and results of calculation. Some basic experimental questions are answered in Chapter IV. In Chapter V the experimental apparatus is described. The data, method of analysis, and corrections are discussed in Chapter VI. In the last chapter a comparison of the experimental results with theoretical predictions is made, and conclusions and suggestions for further work are given.

AD-630 714 Fld. 20/8, 7/4
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
OXYGEN METASTABLE ATOM PRODUCTION THROUGH PHOTODETACHMENT,
by L. M. Branscomb, S. J. Smith, and G. Tisone.
24 May 65, 2p. Contract DA-31-124-ARO (D)-139 ,NBS-CST-1196
AROD 4445:29
Unclassified report

Availability: Published in The Journal of Chemical Physics v43 n8 p2906-7 Oct 15 1965. Copies to DDC users only.

Descriptors: (*Oxygen, *Atomic energy levels), Photochemistry, Atomic properties, Ions, Nuclear cross sections

AD-630 723 Fld. 20/8
CALIFORNIA UNIV SAN DIEGO LA JOLLA INST FOR RADIATION PHYSICS AND AERODYNAMICS
LOW-ENERGY ELECTRON SCATTERING BY METASTABLE HELIUM,
by R. Marriott. 24 Aug 65, 10p. Contract DA-31-124-ARO (D)-257,
AROD 5133:19
Unclassified report

Availability: Published in Proceedings of the Physical Society v87 p407-15 1966. Copies to DDC users only.

Descriptors: (*Helium, Electron bombardment), (*Electron bombardment, Nuclear cross sections), (*Nuclear cross sections, Helium), Atomic energy levels, Elastic scattering, Inelastic scattering, Nuclear spins

All significant partial cross sections for elastic and inelastic scattering of electrons by helium in the singlet and triplet metastable states were calculated in the close-coupling approximation for collision energies up to 7.5 ev. In the doublet total spin system cross sections were obtained both with and without inclusion of coupling to the ground state of helium. In the quartet total spin system cross sections for the elastic scattering of electrons by triplet metastable helium were calculated in the static exchange approximation and with inclusion of coupling to He (1S) (3S) above the threshold for this state. The calculated total cross section for the superelastic process converting the singlet metastable to the triplet state by collision with thermal electrons at 300K is less by a factor of 2 than the experimental value given by Phelps. The estimated total cross sections for the scattering of electrons by triplet metastable helium are less by a factor of 3 than the experimental results of Neynaber et al. for 1 ev electrons. However, the first order partial cross sections are found to yield, in general, a dominant contribution to the total cross sections. It is concluded that the effect of coupling to the nearby 2P helium states, omitted in this calculation, will be important. (Author)

AD-630 886 Fld. 20/8
CFSTI Prices: HC $1.00 MF $0.50
MICHIGAN UNIV ANN ARBOR DEPT OF PHYSICS
ON THE A,T-DEPENDENCE OF COULOMB ENERGIES.
Technical rept.,
by K. T. Hecht. 1965, 11p. Contract Nonr-1224 (59)
Unclassified report

Descriptors: (*Nuclear isobars, Nuclear spins), Mass-energy relation, Tensor analysis, Matrix algebra, Nucleons, Nuclear energy levels

AD-631 012 Fld. 20/8
HARVARD UNIV CAMBRIDGE MASS CYCLOTRON LAB
NEUTRON-PROTON DIFFERENTIAL CROSS SECTION AT 129 AND 150 MEV,
by David F. Measday. 8 Sep 65, 7p.
Unclassified report

Availability: Published in The Physical Review v142 n3 p584-90 Feb 18 1966. Copies to DDC users only.

Descriptors: (*Neutron reactions, Nuclear cross sections), (*Proton scattering, Nuclear cross sections), (*Nuclear cross sections, Measurement), Neutron beams, Energy, Phase shift, Errors

The differential cross section for neutron-proton scattering were measured from 70 to 180 degrees (center-of-mass system) at energies of 129 plus or minus 1 and 150 plus or minus 1 MeV. A neutron beam was used which has an energy width of 6 MeV. The data have relative errors of from 3 to 4%. They were normalized to total-cross-section data with the aid of phase-shift analyses; differences between various solutions imply an uncertainty in the absolute value of these cross-section data of as much as 6.5%. The data at 150 MeV are shown to be more reasonable than previous data in this energy region. The data at 129 MeV agree well with earlier work. (Author)

AD-631 176 Fld. 20/8
CFSTI Prices: HC $1.60 MF $0.50
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
HIGH-ENERGY ELECTRON SCATTERING AS A TEST OF THE NUCLEAR CLUSTER MODEL,
by T. A. Griffy, R. J. Oakes, and H. M. Schwartz.
Mar 66, 19p. Rept. no. HEPL-430,ITP-207
Contract Nonr-225 (67) ,AF 49 (638)-1389
Unclassified report

Prepared in cooperation with Institute of Theoretical Physics, Stanford Univ., Calif.

Descriptors: (*Nuclear models, Tests), (*Electrons, Nuclear scattering), (*Lithium, Electron bombardment), Nuclear cross sections, Potential theory, Beta-particle reactions, Deuteron reactions, Helium

The possibility of using high-energy electron scattering to investigate the cluster model of light nuclei is discussed. The general formulation of the electron-cluster coincidence cross section for processes of the type A (e,e' b)B is given. Final state interactions between the ejected cluster and the residual nucleus are taken into account using a square well optical-model potential. Finally, the formalism is applied to the process Li6 (e,e' d)He4 as an example. (Author)

AD-631 184 Fld. 20/8
CFSTI Prices: HC $1.60 MF $0.50
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
ISOTOPE EFFECT IN CA40, CA44, AND CA48 CHARGE DISTRIBUTIONS FROM 250 MEV ELECTRON SCATTERING.
Journal article,
by K. J. van Oostrum, R. Hofstadter, G. K. Noldeke, M. R. Yearian, and B. C. Clark. Mar 66, 13p. Rept. no. HEPL-429,
Contract Nonr-225 (67) ,NSF-GP-2417
Unclassified report

Prepared in cooperation with General Motors Corp., Warren, Mich. Research Labs. and Illinois Univ., Urbana. Dept. of Physics.

Descriptors: (*Calcium, Electron bombardment), (*Electron beams, Nuclear scattering), Isotopes, Nuclear structure, Nuclear cross sections, Nuclear models, Nuclear energy levels

The cross section for elastic electron scattering from an enriched Ca48 target is measured in comparison with one for Ca40. The angular depen-

cace of the ratio of these two cross sections is fitted by a curve calculated by phase shift analysis. The best fitting values for the changes in the parameters defining the charge distributions of these nuclei lead to the conclusion that the half-way radius increases by 4.1% and the skin thickness decreases by 12.4%, under the assumption that the charge distribution of both nuclei follow the so-called parabolic Fermi model. (Author)

AD-630 586 See Fld. 20/10

AD-630 698 See Fld. 18/9

AD-630 883 See Fld. 7/4

AD-630 996 See Fld. 9/6

AD-631 013 See Fld. 20/10

AD-631 070 See Fld. 20/4

AD-631 108 See Fld. 20/10

20/9. PLASMA PHYSICS

AD-630 632 Fld. 20/9, 12/1, 20/4
CFSTI Prices: HC $1.00 MF $0.50
INNSBRUCK UNIV (AUSTRIA) INST FOR THEORETICAL PHYSICS
A NUMERICAL METHOD FOR SOLVING THE ONE-DIMENSIONAL UNSTEADY MGD BASIC EQUATIONS FOR FINITE MAGNETIC REYNOLDS NUMBER,
by Helmut Friedel. 3 Jul 65, 20p. Rept. no. Scientific-28,
Contract AF 61 (052)-675,
AFOSR 66-0348
Unclassified report

See also AD-618 138.

Descriptors: (*Numerical methods + procedures, Partial differential equations), (*Plasma physics, Equations of motion), Magnetohydrodynamics, Boundary value problems, Austria

A numerical method based on the theory of characteristics for solving the parabolically degenerated one-dimensional unsteady MGD basic equations is described. Convergence and stability of the numerical method are analyzed in detail. (Author)

AD-630 677 Fld. 20/9, 20/4
CFSTI Prices: HC $2.60 MF $0.50
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
NONLINEAR MECHANICS OF PLASMA-LIKE DISTRIBUTED MEDIA.
Technical note,
by Herbert Lashinsky. Jan 66, 28p. Rept. no. BN-432,
Contract AF-AFOSR-1016-66,
AFOSR 66-0616
Unclassified report

Presented at the Symposium on the Dynamics of Plasmas and Fluids, Maryland Univ., College Park, 6-8 Oct 65.

Descriptors: (*Fluid mechanics, *Plasma physics), Nonlinear systems, Plasma oscillations, Magnetohydrodynamics

The finite-amplitude controlled oscillations produced in a thermal-plasma device (Q-machine) as a result of the universal instability provide a useful tool for experimental research in the nonlinear mechanics of plasma -like distributed systems i.e., systems in which the pertinent physical parameters are distributed in one or more of the coordinate variables (position and velocity) used to describe the system, rather than lumped, as in more familiar vacuum-tube or mechanical configurations. Results obtained in such experiments have been analyzed by extending techniques of nonlinear mechanics to distributed systems. In particular, nonlinear phenomena such a mode competition and mode locking have been examined and the relation between these phenomena in plasmas and in related systems such as the gaseous optical maser has been delineated. The current status of this work is reviewed with particular emphasis being given to the analysis of mode locking and the implications of this effect for turbulence in plasmas. (Author)

AD-630 783 Fld. 20/9, 21/3
CFSTI Prices: HC $3.60 MF $0.50
ALLISON DIV GENERAL MOTORS CORP INDIANAPOLIS IND
PLASMA-ELECTRODE PHENOMENA OF THE RAIL TYPE ACCELERATOR,
by D. L. Clingman, and T. L. Rosebrock. Sep 61, 36p. Rept. no. EDR-2277,
Contract AF 49 (638)-864, Proj. AF-9752, Task 37521,
AFOSR 1964
Unclassified report

Descriptors: (*Plasma accelerators, Electrodes), (*Plasma engines, Plasma physics), Electric discharges, Exploding wires, Electrolysis, Electric arcs, Erosion

Real discharge effects are considered for the rail type electromagnetic accelerator with special emphasis devoted to electrode phenomena. Net plasma motion is shown to be independent of arc motion, which may occur in any of three modes. Experimental evidence is cited in support of a discharge model composed of multiple conducting paths in parallel with the main arc. Spectrographic experiments are described in which electrode erosion is found to be virtually nonexistent under conditions of sustained arc motion. (Author)

AD-630 972 Fld. 20/9
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
INVESTIGATION OF THE MOTION OF A PLASMA IN A GAS-DISCHARGE TUBE EQUIPPED WITH COAXIAL ELECTRODES,
by E. K. Chekalin, V. I. Trukhin, and A. I. Lozinskaya. 17 Mar 66, 24p. Rept. no. FTD-TT-65-1890,
TT 66-60988
Unclassified report

Unedited rough draft trans. of mono. Fizicheskaya Gazodinamika Svoistva Gazov pri Visokikh Temperaturakh, n.p. 1964 p59-72.

Descriptors: (*Plasma accelerators, Shock waves), (*Plasma medium, Motion), (*Discharge tubes, Plasma medium), Gas discharges, Velocity, Electrodes, Line spectrum, Pressure, USSR

A study was made of the distribution of velocities of the forward glowing front of the plasma inside a coaxial accelerator in a wide range of an initial air pressures in the tube. Furthermore, observations were conducted on the outflow of plasma from the coaxial accelerator and the reflection of plasma from the face of the tube. Timedependent recordings were made of the impulse of pressure on the face of the tube and of the glow of the plasma. The spectral composition of the plasma was also studied.

AD-631 005 Fld. 20/9, 10/1
CFSTI Prices: HC $7.60 MF $0.75
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
NON-EQUILIBRIUM IONIZATION USING ELECTROSTATIC PROBING TECHNIQUES.
Final technical rept., 1 Mar 65-28 Feb 66,
by Robert H. Bullis, Walter J. Wiegand, and Donald W. Bell. 30 Mar 66, 78p. Rept. no. E-920333-2,
Contract AF 49 (638)-1551, Proj. AF-9752, Task 975201,
AFOSR 66-0633
Unclassified report

Descriptors: (*Thermionic converters, Plasma physics), (*Plasma medium, Analysis), Cesium, Ionization, Additives, Helium group gases, Electrons, Energy, Density, Voltage, Xenon, Krypton, Neon, Transport properties, Probability, Langmuir probes, Spectroscopy

The results of the research program were the determination of the effects of the presence of various inert background gases on the electron energy distribution, electron number density, and potential variation in the plasma of a cesium ignited-mode thermionic converter. Plasma properties are reported for a number of different ratios of inert gas background pressure to cesium pressure for the addition of inert species of xenon, krypton, and neon gases. The report relates findings of this investigation to the transport and ionization processes taking place in the ignited-mode converter through the use of recently available electron-cesium heavy particle cross-section information as well as the detailed information on the plasma properties obtained from the investigations reported in AD-621 276. In conjunction with the electrostatic probe measurements, spectroscopic investigations were conducted to determine the number density of electrons existing in the plasma. Also included in this report are a summary of the over-all accomplishments resulting from these investigations and a bibliography of the publications generated as a result of this study. (Author)

AD-630 549 See Fld. 7/2

AD-630 778 See Fld. 20/14

AD-630 888 See Fld. 10/2

AD-630 934 See Fld. 7/4

AD-631 006 See Fld. 20/4

AD-631 025 See Fld. 4/1

AD-631 070 See Fld. 20/4

AD-631 095 See Fld. 20/14

20/10. QUANTUM THEORY

AD-630 540 Fld. 20/10, 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
THE ANALYTIC CONTINUATION OF THE RESOLVENT KERNEL AND SCATTERING OPERATOR ASSOCIATED WITH THE SCHROEDINGER OPERATOR.
Technical summary rept.,
by C. L. Dolph, J. B. McLeod, and D. Thoe. Feb 66, 36p. Rept. no. MRC-TSR-606,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Operators (Mathematics), *Green's function), (*Functional analysis, Operators (Mathematics)), Potential theory, Scattering, Integrals, Equations of motion

AD-630 542 Fld. 20/10, 12/1
CFSTI Prices: HC $2.00 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON ITERATIVE SOLUTIONS FOR QUANTUM-MECHANICAL BOUND STATES.
Technical summary rept.,
by Peter D. Robinson. Jan 66, 34p. Rept. no. MRC-TSR-609,
Contract DA-11-022-ORD-2059,
Unclassified report

Descriptors: (*Iterative methods, *Quantum mechanics), Integral equations, Green's function, Perturbation theory

Integral forms of Schrodinger's time-independent wave equation are considered, both in coordinate space (using free-particle Green's Functions) and in momentum space. Iterative solutions for bound states are investigated. Previous work is briefly discussed, and possibilities for future progress mentioned. (Author)

AD-630 586 Fld. 20/10, 20/8
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
REGGE-KHURI REPRESENTATION FOR PHOTOPRODUCTION,
by Y. S. Jin, and H. A. Rashid. 14 Feb 64, 16p.
Contract AF-AFOSR-42-64, Proj. AF-9751, Task 975101,
AFOSR 66-0453
Unclassified report

Prepared in cooperation with the Institut fuer Theoretische Kernphysik der T. H. Karlsruhe (Germany).

Availability: Published in Nuclear Physics v58 p611-24 1964. Copies to DDC users only.

Descriptors: (*Photonuclear reactions, Theory), Photons, Mesons, Momentum, Field theory

The Gribov-Froissart continuations of various multipole amplitudes of the photo-pion production process into the complex J-plane are introduced. Assuming the meromorphy of these interpolated multipole amplitudes in the complex J-plane, the Regge-Khuri representation for the photo-pion production is obtained. The contribution of the nucleon Regge pole to the low-energy M1- amplitude is briefly discussed. (Author)

AD-630 621 Fld. 20/10, 20/3
CFSTI Prices: HC $2.60 MF $0.50
OREGON UNIV EUGENE DEPT OF PHYSICS
QUANTUM THEORY OF DYNAMIC MAGNETORESISTANCE.
Technical rept.,
by Shigeji Fujita, and Charles C. Chen. Mar 66, 23p. Rept. no. TR-8,
Contract Nonr-2771 (05), Proj. NR-017-633,
Unclassified report

Descriptors: (*Field theory, Transport properties), Resistance (Electrical), Electrons, Conductivity, Dynamics, Magnetic fields, Integral equations

The connected-diagram expansion method is applied in the evaluation of the dynamic conductivity of an electron-impurity system subjected to a constant magnetic field B. This method treats the two cases, B does not = 0 and B = 0, on the same footing such that the differences appear at the final stage of calculation. A clear physical picture is sustained throughout because no extraneous arguments about the splitting of a density operator into diagonal and non-diagonal parts in free-electron states, which appeared in most of the past literatures, are used. A transport equation in the limits of low impurity density n sub s and small coupling lambda is given explicitly. This equation is meant to describe the dynamic conductivity at an arbitrary frequency omega of an applying electric field and at an arbitrary magnitude of B. It reduces to the transport equation of Argyres in the limit of zero frequency and to that of Yamada-Ron in the limit of zero field. The conductivity in the limits of large omega, large B, small n sub s and small lambda, is calculated explicitly. The limiting forms of the new expressions are in agreement with the result of Titeica (B = 0, omega = 0) and with that of Yamada-Ron (B = 0, omega does not = 0). The expression explicitly indicates that the dynamical response can be no more interpreted in terms of scattering cross section. The conductivity of an electron-phonon system is discussed briefly. (Author)

AD-630 748 Fld. 20/10
CFSTI Prices: HC $1.60 MF $0.50
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
ON THE FEYNMAN INTEGRAL IN DYNAMICS.
Technical summary rept.,
by A. M. Arthurs. Jan 66, 14p. Rept. no. MRC-TSR-618,
Contract DA-11-022-ORD-2059 ,NSG-275-62
Unclassified report

Descriptors: (*Integrals, *Quantum mechanics), (*Hamiltonian, Quantum mechanics), Equations of motion, Dynamics, wave functions

A Hamiltonian form of the Feynman integral is evaluated for the case of classical waves. The work of Corson on a unified formulation of dynamics is also discussed. (Author)

AD-631 013 Fld. 20/10, 20/8
CFSTI Prices: HC $1.10 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
VARIATIONAL PRINCIPLE FOR THE ENERGY OF QUASISTATIONARY STATES,
by V. S. Rudakov. 10 Feb 66, 6p. Rept. no. TG-230-T462,
Contract NOw-62-0604-c,
TT 66-60997
Unclassified report

Trans. of Leningrad Univ. Vestnik (USSR) n16. Seriya Fiziki i Khimii n3 p138-9 1965.

Descriptors: (*Elementary particles, Energy), (*Wave equations, Nuclear energy levels), (*Perturbation theory, Wave equations), Quantum mechanics, S-matrix, USSR

The variational principle for the complex energy of the quasistationary states is formulated for the simplest case of zero angular momentum Schrodinger equation. Application of the variational principle to the perturbation theory and the numerical calculations for the particular case are given. (Author)

AD-631 108 Fld. 20/10, 20/8
STANFORD UNIV CALIF DEPT OF PHYSICS
THRESHOLD EFFECTS IN AVERAGE CROSS SECTIONS ACCORDING TO R-MATRIX THEORY,
by W. E. Meyerhof. 13 Aug 62, 11p. Contract DA-ARO (D)-31-124-G337,
AROD 3269:28
Unclassified report

Availability: Published in Physical Review v129 n2 p692-702 Jan 15 1963. Copies to DDC users only.

Descriptors: (*Nuclear cross section, Theory), Elementary particles, Elastic scattering, Nuclear reactions, Mathematical models, Approximation (Mathematics)

The paper attempts to place on a firm basis certain expressions or effects in elastic and total cross sections caused by--and in the neighborhood of--a reaction threshold. Explicit expressions are derived for the analytic behavior of the collision matrix near a reaction threshold. These expressions are based on the R-matrix theory of nuclear reactions and extend slightly work by Wigner and by Breit on threshold effects. It is shown that certain formulas for energy-averaged total and elastic cross sections, which were made plausible in a previous paper by the author, follow from the above -mentioned general expressions by performing suitable energy averages. Consequences of the random-sign approximation of the 'value quantities' gamma (lambda) and of a partial breakdown of this assumption are examined and related to the assumptions of the optical model. It is shown that under the assumption of random signs, the total cross section should show no threshold effects, whereas if this assumption is relaxed threshold effects appear. Hence it is, in principle, possible to decide by experiment which situation obtains. Finally, cross-section threshold effects under the single-level approximation are given; with a slight generalization of the phase shift, these are identical to expressions derived by Baz and by Newton. (Author)

AD-631 161 Fld. 20/10
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
ANALYTICITY IN POTENTIAL SCATTERING,
by Andre Martin. Feb 64, 68p. Contract AF-AFOSR-42-64, Proj. AF-9751, Task 975101, AFOSR 66-0480
Unclassified report

Availability: Published in Progress in Elementary Particle and Cosmic Ray Physics v8 p1-66 Amsterdam, 1965. Copies to DDC users only.

Descriptors: (*Potential scattering, Reviews), Wave functions, Potential theory, S matrix, Green's function, Analysis

Contents: Partial wave scattering amplitudes; Fixed transfer dispersion relations and 'Lehmann ellipse'; Analytic properties for fixed energy; The Mandelstam representation; Complex angular momenta.

AD-630 583 **See Fld. 20/8**

20/11. SOLID MECHANICS

AD-630 523 Fld. 20/11
CFSTI Prices: HC $1.00 MF $0.50
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
INVESTIGATION OF PLATES AND SHELLS UNDER EXTERNAL LOADING AND ELEVATED TEMPERATURES.
Final rept. for 1965,
by Joseph Kempner. Mar 66, 19p. Rept. no. PIBAL-915,
Contract AF 49 (638)-1360, Proj. AF-9782, Task 978201,
AFOSR 66-0610
Unclassified report

Descriptors: (*Structural shells, Stresses), (*Structural parts, Stresses), Loading (Mechanics), Deformation, Aircraft, Airframes, Buckling (Mechanics), Cylindrical bodies, Guided missile components, Creep, Bending, Metal plates, Thickness, Temperature

The studies briefly described stem from continuing investigations of plates and shells under external loading and elevated temperatures, and include problems of special interest to designers of missiles and aircraft. Chapter I discusses the postbuckling (large-deflection theory) of noncircular (oval) cylindrical shells under axial compression. Chapter II describes work on the analysis of the effects of concentrated loads applied to reinforcing frames of finite and infinitely long circular cylindrical shells. Chapter III presents the results of investigations of the effects of creep in structures, with particular emphasis on the bending of uniform and variable thickness circular plates and the effects of concentrated loads. (Author)

AD-630 543 Fld. 20/11
CFSTI Prices: HC $2.00 MF $0.50
TECHNION ISRAEL INST OF TECH HAIFA DEPT OF AERONAUTICAL ENGINEERING
FURTHER REMARKS ON THE EFFECT OF ECCENTRICITY OF STIFFENERS ON THE GENERAL INSTABILITY OF STIFFENED CYLINDRICAL SHELLS,

by Josef Singer, Menahem Baruch, and Ovadia Harari. Aug 65, 35p. Rept. no. Scientific-2,TAE-42
Contract AF-EOAR-58-63, AFOSR 66-0569

Unclassified report

See also AD-621 342.

Descriptors: (*Stiffened cylinders, Stability), (*Structural shells, Stability), Rings, Hydrostatic pressure, Geometry, Numerical analysis, Israel

The analysis of the general instability of stiffened cylindrical shells under hydrostatic pressure carried out earlier is continued in order to study the inversion of the eccentricity effect. 250 typical shells of varying geometries are considered. The results show that the inversion of the eccentricity effect is practically independent of the geometry of the rings but depends very strongly on the shell geometry parameter Z. A range of inversion is found. A detailed physical explanation of the causes of the eccentricity effect and its inversion is proposed. (Author)

AD-630 650 Fld. 20/11
CFSTI Prices: HC $1.10 MF $0.50
FELTMAN RESEARCH LABS PICATINNY ARSENAL DOVER N J
USE OF THE KERR EFFECT FOR STUDYING A STRESSED STATE OF THIN-WALLED STRUCTURES.
Technical translation,
by V. M. Nikitin. Apr 66, 9p.
PA TT-7 ,TT 66-60900

Unclassified report

Trans. of Zhurnal Prikladnoi Mekhaniki i Tekhnicheskoi Fiziki (USSR) n2 p130-1 1963.

Descriptors: (*Structures, Stresses), (*Magneto-optic effect, Stresses), Thickness, Walls, Electric fields, USSR

A procedure and apparatus for studying stresses in thin-walled structures by means of the Kerr effect are described and discussed. The Kerr effect, which is based on the phenomenon of artificial double ray refraction in fluids when an electric field is applied to the fluid, is used in solving multidimensional problems in the theory of elasticity. (Author)

AD-630 759 Fld. 20/11
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA
A RE-EXAMINATION OF STRESSES IN A TENSION BAR WITH SYMMETRICAL U-SHAPED GROOVES.
Technical Research article,
by Paul D. Flynn, and Arthur A. Roll. Feb 66, 10p. Rept. no. A66-2,
Proj. DA-1P014501B33A

Unclassified report

Availability: Published in Experimental Mechanics p1-6 Feb 1966. Copies to DDC users only.

Descriptors: (*Rods, Photoelasticity), (*Stresses, Rods), Statics, Loading (Mechanics), Distribution

A two-dimensional photoelastic study was made of stress-concentration factors and stress distributions in a statically loaded tension bar with symmetrical U-shaped grooves. A new procedure using a known source of stress concentration in series with an unknown stress concentration was developed which practically eliminates all errors due to time-edge effects, extrapolation procedures and other disturbances. The photoelastic results confirm Kikukawa's observation that the maximum stress concentration may occur in bars with grooves of finite depth rather than with infinitely deep grooves as is generally assumed. (Author)

AD-630 760 Fld. 20/11, 14/2
FRANKFORD ARSENAL PHILADELPHIA PA
DYNAMIC PHOTOELASTICITY.
Technical research article,
by Paul D. Flynn. 12 Aug 65, 14p. Rept. no. A66-3,
Proj. DA-1P014501B33A

Unclassified report

Availability: Published in ISA Transactions v5 n1 p65-73 Jan 1966. Copies to DDC users only.

Descriptors: (*Photoelasticity, Instrumentation), (*Loading (Mechanics), Stresses), Dynamics, Strain (Mechanics), Structures, Machines, Photographic techniques

Dynamic photoelasticity concerns the determination of transient stresses and strains in machine parts or structures subjected to impact or shock loading. Progress in this field has paralleled the development and application of new techniques in high-speed photography. The paper describes the instrumentation which has been developed in recent years for studying transient stresses in two-dimensional photoelastic models made of either low- or high-modulus material subjected to mechanical or explosive loads. (Author)

AD-630 773 Fld. 20/11
CFSTI Prices: HC $4.60 MF $0.50
CALIFORNIA UNIV BERKELEY DIV OF APPLIED MECHANICS
DYNAMIC STABILITY OF AUTONOMOUS AND CONTINUOUS ELASTIC SYSTEMS.
Technical rept.,
by C. S. Hsu. Jan 66, 46p. Rept. no. AM-66-3,
Contract Nonr-222 (69), Proj. NR-064-436,

Unclassified report

Descriptors: (*Dynamics, *Elasticity), (*Stability, Nonlinear systems), Equations of motion, Functional analysis, Boundary value problems

The dynamical behavior of autonomous and continuous elastic systems is studied qualitatively in terms of trajectories in appropriately defined functional phase spaces. It is found that the local stability of equilibrium configurations in a dynamical sense and the stability in the large may be investigated in a more satisfactory manner by adopting this approach. By studying the distribution of the equilibrium configurations in the functional phase space and by extending Liapunov's theorems on stability to continuous systems, sufficiency regions of stability can be established for the following types of problems: elastic systems subjected to (at t=0) impulsive body loads, sudden changes of body loads, sudden changes of boundary conditions of 'traction' type, and sudden changes of body loads of finite duration. (Author)

AD-630 798 Fld. 20/11
CFSTI Prices: HC $3.00 MF $0.50
PENNSYLVANIA STATE UNIV UNIVERSITY PARK ORDNANCE RESEARCH LAB
INTERNAL FRICTION STUDIES ON BELL METAL AND WOOD.
Technical memo.,
by R. Kerlin. 14 Mar 66, 56p. Rept. no. TM-603.2811-05,
Contract NOw-65-0123-d ,AF-AFOSR-43-63

Unclassified report

Descriptors: (*Bronze, Internal friction), (*Wood, Internal friction), Non-destructive testing, Vibration, Torsion, Bending, Heat flux, Shear stresses

The internal friction of bell metal and wood is of general interest not only from the standpoint of material testing but also for providing a physical explanation of the musical properties of these materials. An electrodynamic type apparatus was used to excite freely suspended rod samples in the longitudinal, bending and torsional modes of vibration at low levels of stress amplitude over the audible frequency range. The techniques of loss factor measurements are described. Experimental results are presented which verify a relaxation-type behavior in the losses of bell metal due to intercrystalline heat flow. Measurements on five different types of wood indicate the general behavior of losses associated with Young's modulus and shear for propagation in rods oriented along the grain. The losses of one cross-grain specimen are reported. Dependence of losses on amplitude of applied stresses, rod geometry and moisture content (in wood) are observed and noted. (Author)

AD-630 922 Fld. 20/11, 20/13
CFSTI Prices: HC $1.60 MF $0.50
BROWN UNIV PROVIDENCE R I DIV OF ENGINEERING
ON STABILITY OF VISCOPLASTIC SYSTEMS WITH THERMOMECHANICAL COUPLING.
Technical rept.,
by David Rubin, and D. C. Drucker. Nov 65, 19p. Rept. no. TR-47,
Contract Nonr-562 (20), Proj. NR-064-424,

Unclassified report

Descriptors: (*Viscosity, Stability), (*Plasticity, Stability), Thermal stresses, Elasticity, Deformation, Heat transfer, Mechanical properties, Mathematical analysis

The stability of equilibrium configurations of thermo -mechanically coupled systems in the plastic and the viscoplastic range is examined through simple examples and by dimensional analysis. A uniform fully-insulated thin-walled tube twisted into the inelastic range is studied first. The material is idealized as linear work-hardening viscoplastic with a current yield stress which decreases linearly with increase in temperature. Any annealing or age-hardening or similar influence of time at temperature is supposed negligible. A local stability criterion beta > 1 governs, where beta is the ratio of the heat stored in the material to the heat generated by inelastic deformation with a given temperature rise. Neither viscosity nor heat conduction enters into the stability or instability of this homogeneous system. They both play a role in successive modifications of the simple model which demonstrate the stabilizing effect of heat transfer to the surroundings and of the heat capacity in regions of material below yield. (Author)

AD-630 926 Fld. 20/11, 11/6, 11/9
CFSTI Prices: HC $3.00 MF $0.75
SIKORSKY AIRCRAFT DIV UNITED AIRCRAFT CORP STRATFORD CONN
FATIGUE CRACK PROPAGATION IN AIRCRAFT MATERIALS,
Rept. for 25 Feb 63-31 Aug 65,
by William G. Degnan, Peter D. Dripchak, and Charles J. Matusovich. Mar 66, 74p. Rept. no. SER-50411,
Contract DA-44-177-AMC-84 (T) Task 1P125901A14227,
USAAVLABS TR-66-9

Unclassified report

Descriptors: (*Aircraft, Materials), (*Alloys, *Fatigue (Mechanics)), Aluminum alloys, Magnesium alloys, Titanium alloys, Steel, Laminated plastics, Fracture (Mechanics), Tensile properties, Toughness, Cold working

The influence of metallurgical, chemical, and geometric variables on fatigue crack propagation rates was investigated in alloys of aluminum, magnesium, steel, and titanium. Some limited fatigue crack propagation was done in laminated plastics. A possible correlation between fatigue crack propagation, fracture toughness, and tensile strength was also investigated. All materials are ranked according to their resistance to fatigue crack propagation. The critical plane strain fracture toughness, critical plane stress fracture toughness (where applicable), ultimate tensile strength, and per cent elongation are also reported for all materials. For the materials tested in this program, there was no appreciable thickness or chemical effect. Shot-peening did increase resistance to fatigue crack propagation. In

general, there was an increase in the resistance to fatigue crack propagation in materials with greater ductility. The correlation between fatigue crack propagation and static fracture toughness was very poor. The crack propagation results of laminated plastics was also considered unsatisfactory. (Author)

AD-631 100 Fld. 20/11
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF AERONAUTICAL ENGINEERING
ON THE BUCKLING OF UNSTIFFENED ORTHOTROPIC AND STIFFENED CONICAL SHELLS (1,2),
by J. Singer. 1965, 24p. Contract AF-EOAR-62-61 ,AF-EOAR-58-63
AFOSR 66-0327

Unclassified report

Availability: Published in Presented at International Congress (7th CIAe) Paris, France p1-22 June 14-16 1965. Copies to DDC users only.

Descriptors: (*Buckling (Mechanics), *Structural shells), (*Conical bodies, Buckling (Mechanics)), Reinforcing materials, Elasticity, Stability, Loading (Mechanics), Israel

A linear theory developed earlier for the analysis of the instability of isotropic conical shells under external pressure is described briefly. Recent experiments with electroformed specimens are shown to be even in better agreement with theory than previous tests. Extensions of the method to other loading cases are discussed with their experimental confirmation. Results of a similar method of analysis for clamped conical shells under external pressure are presented. Boundary conditions are discussed in the light of recent conclusions as to their effect on the buckling of cylindrical shells. The extension of the method of analysis for buckling of orthotropic shells under external pressure, torsion and axial compression is then considered, and recent experimental results are described. For stiffened shells, the more accurate approach of 'distributed stiffeners', which permits consideration of the effect of eccentricity of stiffeners, is reviewed. Results for conical shells with uniformly and non-uniformly spaced stiffeners under external pressure are discussed and related to optimization studies. Recent experiments on stiffened conical shells under external pressure and some preliminary tests under axial compression and torsion are then described. The behavior of conical shells under combined loading is then considered and interaction curves are presented for isotropic and orthotropic conical shells. (Author)

AD-631 160 Fld. 20/11
NORTHWESTERN UNIV EVANSTON ILL
MOVING LOAD ON A FLEXIBLY SUPPORTED TIMOSHENKO BEAM,
by J. D. Achenbach, and C. T. Sun. 15 Oct 64, 20p. Contract AF-AFOSR-100-64,
AFOSR 66-0119

Unclassified report

Availability: Published in International Journal of Solids and Structures v1 p353-70 1965. Copies to DDC users only.

Descriptors: (*Beams (Structural), *Loading (Mechanics)), Damping, Velocity, Rotation, Mathematical analysis, Supports

A uniform beam of infinite length is subjected to a force whose point of application moves with constant velocity over the beam. Solutions are obtained that are time invariant in a coordinate system moving with the load velocity. The supporting foundation includes damping effects. The influence of the damping coefficient and the load velocity on the beam response is studied. The limiting case of no damping is included and the various resonance effects are clarified. (Author)

AD-630 592 **See Fld. 19/4**

AD-630 686 **See Fld. 19/6**

AD-630 719 **See Fld. 20/12**

AD-630 740 **See Fld. 13/9**

AD-630 758 **See Fld. 19/6**

AD-630 794 **See Fld. 20/1**

AD-630 833 **See Fld. 11/2**

AD-630 852 **See Fld. 14/2**

AD-630 871 **See Fld. 11/6**

AD-630 884 **See Fld. 11/4**

AD-630 913 **See Fld. 11/9**

AD-630 923 **See Fld. 11/6**

AD-631 070 **See Fld. 20/4**

AD-631 140 **See Fld. 8/12**

AD-631 153 **See Fld. 11/6**

20/12. SOLID STATE PHYSICS

AD-630 596 Fld. 20/12, 11/11
CFSTI Prices: HC $1.10 MF $0.50
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
SOME REMARKS ON GRAIN BOUNDARY MIGRATION.
Scientific paper,
by G. F. Bolling. 10 Apr 62, 5p. Rept. no. SP-62-925-116-P5,
Contract AF 49 (638)-1029,
AFOSR 2649

Unclassified report

Descriptors: (*Zone melting, Grain boundaries), (*Grain boundaries, Movement), Solid solutions, Concentration (Chemistry), Heat of activation

The relationship of solute concentration and grain boundary migration in zone-refined metals is discussed.

AD-630 615 Fld. 20/12
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
OBSERVATION OF EXPONENTIAL BAND EDGES IN DEGENERATE N-TYPE GERMANIUM.
Physical sciences research papers,
by F. D. Shepherd,Jr., V. E. Vickers, and A. C. Yang. 27 Aug 65, 6p. Rept. no. AFCRL-PSRP-197
Proj. AF-5621, Task 562103,

Unclassified report

Availability: Published in Proceedings of the IEEE v53 n11 p1759-60 Nov 1965. Copies to DDC users only.

Descriptors: (*Germanium, *Band theory of solids), Impurities, Tunneling (Electronics)

The method of analysis of fine structure in tunnel currents recently reported by Shepherd, Yang, Vickers, and King, has been applied to N-type degenerate germanium. The results indicate that the energy band edge of this material is exponential rather than parabolic because of the large number of randomly distributed active impurities. (Author)

AD-630 681 Fld. 20/12, 7/4
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS
MAGNETIC-DIPOLE INTENSITIES AND ZEEMAN EFFECT IN CS2UC16,
by D. Johnston, R. Sattler, and E. Wong. 28 Sep 65, 5p. Contract DA-31-124-ARO (D)-219
AROD 2099:24

Unclassified report

Availability: Published in The Journal of Chemical Physics v44 n2 p687-91 Jan 15 1966. Copies to DDC users only.

Descriptors: (*Uranium, Dipole moments), (*Dipole moments, Uranium), (*Line spectrum, Uranium), (*Line spectrum, Uranium), (*Magnetic moments, Uranium), Atomic energy levels, Cesium compounds, Chlorine compounds, Uranates, Crystals, Polarization, Intensity

The oscillator strengths of several magnetic-dipole transitions for U (4+) in Cs2UCl6 were measured and compared with calculated values using the eigenfunctions previously determined. The Zeeman effect of the only line showing a splitting in a 30-kg field in the photographic region of the spectrum was observed and parallel and perpendicular g values were compared with theoretical values. The second-degree term of the D3d crystalline-field distortion from the large cubic field was obtained. (Author)

AD-630 701 Fld. 20/12, 18/3
CFSTI Prices: HC $2.00 MF $0.50
RENSSELAER POLYTECHNIC INST TROY N Y
INVESTIGATION OF TRANSIENT RADIATION DAMAGE IN SEMICONDUCTOR MATERIALS.
Final rept. 1 Feb 63-30 Sep 65,
by John C. Corelli, Arthur R. Frederickson, James W. Westhead, Roland M. Lichtenstein, and H. James Willard,Jr.. Mar 66, 46p. Contract DA-36-039-AMC-02165 (E), Proj. 5974.01.004.36,5900.21.8
30.23 Task 5974.01.004.36.00, 5900.21.830.23.00

Unclassified report

See also AD-627 392, AD-627 393.

Descriptors: (*Semiconductors, *Electron bombardment), Silicon, Life expectancy, Photoconductivity, Hall effect, Damage, Radiation damage, Conductivity

A contactless method was developed for measuring induced photoconductivity in silicon. The method was used to search for transient radiation damage effects in silicon specimens irradiated by short bursts of high energy electrons. The investigation showed that transient radiation damage in silicon at room temperature is a minor effect when compared with permanent damage if the damage is assessed by way of the decay time of induced photoconductivity. No transient damage (as opposed to permanent damage) survives to 1.3 milliseconds after the instant when the damage is produced. Transient radiation damage experiments indicate that in p-type silicon the transient Hall and conductivity voltages decay in about 20-50 microseconds. Relatively long saturation times (about 10 to 100 microseconds) are observed in the transient Hall and conductivity voltage following an electron burst. The saturation time decreases with dose accumulation and also decreases as the irradiation temperature of the sample is decreased. Very similar effects also are observed in n-type silicon samples. In both n- and p-type silicon the Hall and conductivity voltages decay with about the same time constant.

AD-630 719 Fld. 20/12, 20/11, 9/1
CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING
DIRECT PIEZOELECTRIC COUPLING OF SURFACE ELASTIC WAVES,
by R. M. White, and F. W. Voltmer. 14 Oct 64, 3p. Contract DA-ARO (D)-31-124-G678,
AROD 5718:1

Unclassified report

Availability: Published in Applied Physics Letters v7 n12 p314-6 Dec 15 1965. Copies to DDC users only.

Descriptors: (*Mechanical waves, Piezoelectric crystals), (*Piezoelectric crystals, Mechanical waves), Surface properties, Velocity, Quartz, Cadmium compounds, Sulfides, Crystals, Silicon compounds, Dioxides

Direct piezoelectric surface wave transduction is reported by a spatially periodic electrode on the plane surface of a piezoelectric plate. A periodic electric field is produced when an rf source is connected to the electrode, permitting piezoelectric coupling to a traveling surface wave. Also described are measurements of surface wave velocity in quartz, aend the surface wave attenuation produced by thin cadmium sulfide films.

AD-630 863 Fld. 20/12, 7/4
CFSTI Prices: HC $4.60 MF $0.50
BROWN UNIV PROVIDENCE R I
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS. PART I. STUDY OF CDS SURFACES BY LEED. PART II. COMBINED LEED AND MASS SPECTROMETER MEASUREMENTS FOR ADSORPTION AND CATALYSIS.
Progress rept. no. 8 (Semi-annual), 1 Jul-31 Dec 65,
by H. E. Farnsworth, B. D. Campbell, and M. Onchi. Mar 66, 49p. Contract DA-28-043-AMC-00299 (E), Proj. DA-200-14501-B11B
Unclassified report

See also AD-623 174.

Descriptors: (*Semiconductors, Surface properties), (*Catalysts, Surface properties), (*Cadmium compounds, Sulfides), (*Nickel, Adsorption), Metals, Electron diffraction analysis, Mass spectroscopy, Illumination, Oxygen, Heating, Voltage Carbon monoxide, Oxidation, Catalysis

A study was made of cadmium sulfide surfaces by low energy electron diffraction (LEED). The influence of illumination on the adsorption of oxygen was observed for various conditions of the surface. The photo-stimulated adsorption of oxygen was compared with the adsorption promoted by the presence of a hot filament near the sample. From the changes in potential measured during the adsorption process it was concluded that atomic oxygen is probably the adsorbate species. Combined electron diffraction and mass spectrometer measurements were applied to the adsorption of carbon monoxide on nickel. These techniques enabled the observation of surface structures as a function of the adsorbed species as well as the conditions of the surface which enhanced the adsorption of the carbon monoxide and desorption with self-oxidation to form carbon dioxide. (Author)

AD-631 000 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
COLD REGIONS RESEARCH AND ENGINEERING LAB HANOVER N H
CONSIDERATIONS OF THE STRENGTH OF SNOW.
Research rept.,
by G. E. H. Ballard, and E. D. Feldt. Dec 65, 18p. Rept. no. CRREL-RR-184, Task 1V014501B52A02,
Unclassified report

Descriptors: (*Snow, Compressive properties), Porous materials, Age hardening, Molecular properties, Failure (Mechanics), Mathematical models

A mathematical model is presented for the number and size of bonds intersected by a potential failure surface which is age hardening at a constant porosity.

AD-631 010 Fld. 20/12, 7/4
NAVAL ORDNANCE LAB CORONA CALIF
SOME FERROELECTRIC AND DIELECTRIC PROPERTIES OF TRIGLYCINE FLUOBERYLLATE.
Revised ed.,
by H. H. Wieder, and C. R. Parkerson. 27 Aug 65, 9p.
Unclassified report

Revision of manuscript submitted 26 May 65.

Availability: Published in The Journal of Physics and Chemistry of Solids v27 p247-52 1966. Copies to DDC users only.

Descriptors: (*Glycines, Electromagnetic properties), (*Beryllium compounds, Electromagnetic properties), (*Fluorides, Electromagnetic properties), Ferroelectricity, Dielectric properties, Crystal structure, Crystal growth, Transition temperature, Polarization, Anisotropy

Large area tabular TGFB crystals with inhibited growth along the /001/ direction were grown by doping the growth solution with selected monovalent cations. Irrespective of crystalline habit, the Curie temperature of TGFB was found to be 73 plus or minus 0.2C, the Curie constant 2512 plus or minus 80C and the ratio of the slope of the dielectric stiffness in the ferroelectric to that of the paraelectric region is -3.99. At +25C, the spontaneous polarization 0.0000037 C/sq cm and the 50 c/s 'coercivity' is 1.1 kV/cm. Crystalline imperfections introduced during growth are distributed anisotropically and have a marked effect upon the dielectric and ferroelectric polarization process in TGFB. (Author)

AD-631 044 Fld. 20/12, 20/2
CFSTI Prices: HC $1.60 MF $0.50
SOREQ RESEARCH ESTABLISHMENT ISRAEL ATOMIC ENERGY COMMISSION YAVNEH
OPTICAL AND ELECTRICAL PROPERTIES OF DIAMOND.
Annual summary rept. no. 2, 1 Nov 64-31 Oct 65, by A. Halperin. 31 Oct 65, 11p. Contract AF 61 (052)-759, AFCRL 66-213
Unclassified report

Descriptors: (*Diamonds, Optical properties), (*Semiconductors, Electrical properties), (*Luminescence, Semiconductors), Electroluminescence, Thermal properties, Photoconductivity, Frequency, Kinetic theory, Electrical conductance, Low-temperature research, Israel

THERMOLUMINESCENCE OF SEMICONDUCTING AND INSULATING DIAMONDS: Glow curves showed peaks near 150 and 250 degrees K. Blue thermoluminescence could be excited by wavelengths up to 0.4 micron. Red -emitting glow peaks were found at 175 and 290 K that could be excited up to about 0.6 micron. DARK CURRENT AND PHOTOCONDUCTIVITY IN SEMICONDUCTING DIAMOND: Direction of rectification between 80 and 373 K indicated p-type conductivity. ELECTROLUMINESCENCE (EL) OF SEMICONDUCTING DIAMONDS: At low temperature the emission spectrum was mainly blue, the red becoming comparatively stronger at higher temperature. Plots of the log of the EL brightness vs 1/square root of V gave 2 straight lines differing in slope, with higher slope at higher voltages. EL was observed with voltages smaller than the 5.5-ev band gap. THEORETICAL INVESTIGATIONS (see also AD-621 037, AD-621 038): Kinetics of luminescence were investigated when electrons are excited to the conduction band before falling to a center and when transition is through a discrete excited state.

AD-631 102 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
MEASUREMENT OF THE LIFETIME OF MINORITY CURRENT CARRIERS IN GE AND SI BY OBSERVING THE PHOTOCONDUCTIVE DECAY OF THE SPREADING RESISTANCE UNDER A POINT CONTACT.
Research translation,
by Zhuang Wei-hwa, and Pan Gui-sheng. Feb 66, 25p. Rept. no. Emm-65-16, Contract AF 19 (628)-5073, TT 66-61014
Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v19 n3 p191-201 1963.

Descriptors: (*Carriers (Semiconductors), Measurement), (*Photoconductivity, *Semiconductors), (*Germanium, Carriers (Semiconductors)), (*Silicon, Carriers (Semiconductors)), Resistance (Electrical), Surfaces, Excitation, China

The paper presents a study of the photoconductive decay of the spreading resistance of Ge and Si under various exciting lights and surface conditions. The influence of the surface recombination velocity and exciting light on the shape of the decay curve is also studied, and a simple method is described for testing the volume lifetime.

AD-631 119 Fld. 20/12
CFSTI Prices: HC $2.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
MEASUREMENT OF THE LIFETIME OF MINORITY CURRENT CARRIERS IN SEMICONDUCTORS BY OBSERVING THE PHOTOCONDUCTIVE DECAY OF THE SPREADING RESISTANCE UNDER A POINT CONTACT.
Research translation,
by Wang Shou-wu. Feb 66, 30p. Rept. no. Emm-65-14, Contract AF 19 (628)-5073, TT 66-61023
Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v19 n3 p176-90 1963.

Descriptors: (*Carriers (Semiconductors), Measurement), (*Semiconductors, *Photoconductivity), (*Germanium, Carriers (Semiconductors)), (*Silicon, Carriers (Semiconductors)), Light, Absorption, Excitation, Resistance (Electrical), Surfaces, China

The paper describes a new method for measuring the lifetime of minority current carriers in semiconductors by observing the photoconductive decay of the spreading resistance under a point contact. The method has the following advantages: (1) it is not necessary to cut the specimen into a special form; (2) no fixed electrode has to be attached to the specimen; (3) it is applicable to testing inhomogeneous specimens; (4) no particular surface treatments is necessary; (5) the apparatus used is simple and easy to operate; (6) the accuracy obtained is sufficient. The paper also gives a theoretical analysis of the effects of the surface recombination velocity and of the varying absorption depth of the light in the specimen. Experimental data on Ge and Si specimens are discussed. The results are in agreement with those obtained by other methods. (Author)

AD-631 187 Fld. 20/12
CFSTI Prices: HC $1.00 MF $0.50
NEBRASKA UNIV LINCOLN
A LITERATURE SURVEY ON INTERFACES, THIN DIELECTRIC FILMS AND SURFACES, 1965,
by N. M. Bashara. 1 Apr 66, 23p. Contract Nonr-3718 (01), Proj. NR-039 079,
Unclassified report

Descriptors: (*Dielectric films, Reviews), Surfaces, Semiconductor devices, Bibliographies

A survey is given of the significant literature on dielectric films and related phenomena to be pub-

lished in the annual 'Digest of the Literature on Dielectrics,' National Academy of Sciences - National Research Council. (Author)

AD-630 587 See Fld. 9/1

AD-630 653 See Fld. 5/1

AD-630 680 See Fld. 9/1

AD-630 700 See Fld. 13/8

AD-630 918 See Fld. 5/1

AD-630 930 See Fld. 20/3

AD-630 984 See Fld. 11/6

AD-631 068 See Fld. 20/3

AD-631 073 See Fld. 20/2

AD-631 110 See Fld. 7/4

AD-631 180 See Fld. 17/9

20/13. THERMODYNAMICS

AD-630 550 Fld. 20/13, 7/4
CFSTI Prices: HC $5.60 MF $0.50
IIT RESEARCH INST CHICAGO ILL TECHNOLOGY CENTER
PHASE MIGRATION IN A MONOTHERMAL FIELD.
Annual rept., 1 Dec 64-30 Nov 65 (Scientific),
by Ted A. Erikson. 17 Jan 66, 55p. Rept. no. IITRI-C212-10,
Contract AF 49 (638)-1121, Proj. AF-9751,IITRI-C212 Task 37510,975102
AFOSR 66-0618

Unclassified report

See also AD-625 363, AD-625 994.

Descriptors: (*Phase studies, Thermodynamics), (*Thermodynamics, Phase studies), Water, Vaporization, Pressure, Nitroglycerin, Sensitivity, Heat transfer, Experimental data, Surface properties

The project is concerned with the study of various nonequilibrium processes, specifically those that can be conducted at a steady rate. New experimental data are interpreted on the basis that the properties of terminal stationary states will define the steady flow of heat, mass, and/or volume across a gradient region. A major point of emphasis is that experimental unknowns are lumped into a clearly defined gradient region so that data correlation can be established by properties of well-defined terminal regions. This is different from usual kinetic and heat-transfer approaches in which temperature gradients pose a serious problem when experimental verification is required on a microscopic basis. Surface temperatures in accommodation experiments are a good example. (Author) As appendixes there are attached papers on (1) migrational properties for the steady forced vaporization of water, (2) critical pressure index for nitroglycerine sensitivity, and (3) cluster coefficient of water.

AD-630 762 Fld. 20/13
CFSTI Prices: HC $5.00 MF $1.00
NUCLEAR POWER FIELD OFFICE FORT BELVOIR VA ADVANCED POWER CONVERSION DEVELOPMENT BRANCH
THERMODYNAMIC PROPERTIES OF MOLECULAR NITROGEN,
by Franklin D. Jordan. Jan 66, 153p. Rept. no. 82,
Proj. APCD-4A643318D887,

Unclassified report

Descriptors: (*Nitrogen, Thermodynamics), Molecular properties, Enthalpy, Entropy, Specific heat, Density, Sound, Velocity, Viscosity, Low frequency, Tables

The tables include enthalpy, entropy, specific heat at constant pressure, ratio of specific heats, density, speed of sound at very low frequencies, and coefficient of viscosity. The tables of real-gas thermodynamic properties are presented for pressures of .01, 0.1, 0.4, 0.7, 1, 2, 3, ..., 29, 30, 32, ..., 38, 40, 50, 70, and 100 atmospheres. The temperatures involved cover the range of 270 R up to 2160 R. All data are given in dimensionless form. The conversion factors for adaptation of the data to more frequently used units are also included. (Author)

AD-631 007 Fld. 20/13, 7/4, 20/4
CFSTI Prices: HC $4.60 MF $0.50
MASSACHUSETTS INST OF TECH CAMBRIDGE FLUID DYNAMICS RESEARCH LAB
FORMULA FOR THERMAL ACCOMMODATION COEFFICIENT,
by Frank O. Goodman, and Harold Y. Wachman. Feb 66, 44p. Rept. no. 66-1,
Contract AF 49 (638)-1601 ,Nonr-3963 (03)
AFOSR 66-0295

Unclassified report

Research supported in part by NASA, Grant NGR-22-009-121.

Descriptors: (*Gases, Thermodynamics), (*Solids, Thermodynamics), (*Thermodynamics, Surfaces), Atoms, Energy, Mathematical analysis

A simple formula in closed form is proposed for the thermal accommodation coefficient from which the accommodation coefficient of a monatomic gas-solid system may be calculated from certain basic parameters of the system. The formula is obtained from consideration of certain aspects of Goodman's lattice theory of accommodation and from conclusions regarding certain properties of available experimental data. Adequate agreement is obtained of the formula with both the lattice theory and the experimental data. Certain corrections are applied to the lattice theory, and the gas-surface potential interaction parameters relevant to the lattice theory are revised. (Author)

AD-630 522 See Fld. 20/4

AD-630 556 See Fld. 17/9

AD-630 588 See Fld. 20/4

AD-630 750 See Fld. 14/2

AD-630 849 See Fld. 21/5

AD-630 901 See Fld. 22/2

AD-630 914 See Fld. 11/2

AD-630 922 See Fld. 20/11

AD-630 980 See Fld. 11/2

AD-630 982 See Fld. 8/12

AD-631 162 See Fld. 3/2

20/14. WAVE PROPAGATION

AD-630 612 Fld. 20/14, 12/1
CFSTI Prices: HC $3.60 MF $0.50
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
NUMERICAL SOLUTION OF FULL-WAVE EQUATION WITH MODE-COUPLING.
Physical sciences research papers,
by Yuji Inque, and Samuel Horowitz. Feb 66, 40p. Rept. no. AFCRL-PSRP-196,AFCRL-66-114
Proj. AF-5631, Task 563109,

Unclassified report

Descriptors: (*Electromagnetic waves, Propagation), (*Numerical methods + procedures, *Differential equations), Programming (Computers), Matrix algebra, Field theory

A new method for the numerical solution of the wave equation governing the propagation of electromagnetic waves in a horizontally stratified, inhomogeneous, anisotropic layer is described. The wave equation is a homogeneous set of four linear differential equations of the first order. In the computer calculation, all singularities of the wave equation are removed in practical cases and a proper step-size based on the gradients of the medium properties is programmed automatically. The multiplicative nature of the solutions facilitates the procedure. Modification of solutions from one height to another is expressed in explicit form on the assumption that the propagation tensor varies linearly with height in each step of integration. In the mathematical development, matrix operations are extensively used in order to achieve a general representation. Four independent solutions of the wave equation are derived. During an ordinary integration for an inhomogeneous medium, a degradation occurs inevitably in the degree of linear independence among special solutions. This cause is analyzed. To obtain a complete set of special solutions with good linear independence, a particular device is developed for general applications. This method has been programmed for computer calculation by an IBM 7090. The resultant wave fields and wave polarizations for the independent modes are shown for a model ionosphere. The resultant wave is described as a 'scrambling' of four characteristic waves. The 'scrambling' state is visualized at each height. (Author)

AD-630 704 Fld. 20/14
CFSTI Prices: HC $2.60 MF $0.50
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING
TRANSIENTS IN MAGNETO-IONIC MEDIA AND INTERRELATIONS BETWEEN ORDINARY AND EXTRAORDINARY WAVE REPRESENTATIONS.
Technical rept.,
by Akira Ishimaru. Dec 65, 23p. Rept. no. TR-100,
Contract AF 19 (628)-2763, Proj. AF-5635 Task 563502,
AFCRL 66-68

Unclassified report

Descriptors: (*Transients, Ionospheric propagation), (*Magnetic fields, *Ionospheric propagation), Harmonic analysis, Integral transforms, Field theory

For a time harmonic case, ordinary and extraordinary waves are independent modes in magneto-ionic media. However, for a transient, an inverse Laplace transform of the time harmonic solution of each mode does not yield a real function of time, and a special care, which is unnecessary for isotropic media, must be taken for magneto-ionic media. This paper discusses this aspect of the transient and shows a general form of the representations of the transient which clarifies the interrelations between ordinary and extraordinary wave representation. (Author)

AD-630 778 Fld. 20/14, 20/9
ILLINOIS UNIV URBANA GASEOUS ELECTRONICS LAB
LINEARLY POLARIZED CHARACTERISTIC WAVES IN A MAGNETOPLASMA.
Revised ed.,
by Joseph T. Verdeyen. 9 Aug 65, 16p. Rept. no. scientific-4,
Contract AF 19 (628)-2391, Proj. AF-8605, Task 860502,
AFCRL 66-183

Unclassified report

Revision of manuscript submitted 21 Jun 65.

Availability: Published in Radio Science v1 (New Series) n1 p37-46 Jan 1966. Copies to DDC users only.

Descriptors: (*Electromagnetic waves, Plasma medium), (*Plasma physics, Electromagnetic waves), Propagation, Magnetic fields, Polarization, Refractive index

It is shown that linearly polarized electromagnetic waves can exist in a bounded magnetoplasma and propagate at an arbitrary angle with respect to the magnetic field lines. Although the electric field of these waves is linearly polarized, the refractive index vector consists of real and imaginary parts which are othogonal to each other in a collisionless plasma. The amplitude of the fields grow in direction of the imaginary part of the refractive index, and thus one surface must always be present to terminate and to guide the electromagnetic fields. Hence this theory is a generalization of surface-wave phenomena occurring in magnetoplasmas. Expressions are developed which explicitly show the dependence of the real and imaginary parts of the refractive index upon the plasma parameters for an arbitrary angle of propagation with respect to the magnetic field. The special case of the propagation vector and the electric field oriented perpendicular to the magnetic field is discussed in detail. Experiments are presented which are in excellent agreement with the surface-wave theory of this special case. (Author)

AD-630 895 Fld. 20/14, 17/2.1
CFSTI Prices: HC $6.60 MF $0.75
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
ELECTRONIC EQUIPMENT INTERFERENCE CHARACTERISTICS-COMMUNICATION TYPE.
Quarterly technical rept. no. 10, 1 Oct-31 Dec 65,
by William R. Free, and Bernard M. Jenkins. Feb 66, 66p. Rept. no. 31,A-678-10
Contract DA-36-039-AMC-02294 (E), Proj. DA-1E6-20501-D-449,
ECOM 02294-10

Unclassified report

Descriptors: (*Electromagnetic compatibility, *Communication equipment), (*Radiofrequency interference, Measurement), Army equipment, Electronic equipment, Antenna radiation patterns, Test equipment (Electronics), Antennas, Probes (Electromagnetic)

During the period covered by this report, investigations to extend the determination of the interference characteristics of U. S. Army communication equipment to include the case emission and susceptibility characteristics have continued. A hooded antenna technique has benn developed which shows considerable promise of satisfying the measurement requirements. This technique consists of mounting the test antenna in an absorber-lined hood which shields the probe in all but the desired direction. The major emphasis during this period has been on the development and evaluation of small, broadband, balanced, circularly-polarized antennas capable of being operated in an antenna hood of reasonable size. The development and evaluation of a d0 degree conical log-helix antenna and a 'short' crossed bow-tie antenna are discussed. In addition, a short dipole antenna incorporating transistor emitter-followers was designed, fabricated, and evaluated during this reporting period. A program to investigate the feasibility of obtaining satisfactory operation of a conical log-helix antenna at lower frequencies by loading the antenna with carbonyl iron material was initiated during this period. The study to define the problems associated with near-field measurements has continued. (Author)

AD-630 990 Fld. 20/14
CFSTI Prices: HC $5.60 MF $0.50
NAVY ELECTRONICS LAB SAN DIEGO CALIF
HF EXTENDED GROUND SYSTEMS: RESULTS OF A NUMERICAL ANALYSIS.
Research rept. Jun-Nov 65,
by G. D. Bernard, W. E. Gustafson, and W. M. Chase. 24 Feb 66, 54p. Rept. no. NEL-1359,
Proj. SF-006-03-05 Task 7916 (NEL-B14561)

Unclassified report

Descriptors: (*Numerical analysis, *Electromagnetic properties), High frequency, Propagation, Antenna radiation patterns, Model theory, Soils, Programming (Computers)

High-speed computations were made of the improvement in low-angle vertically polarized radiation obtainable with various sizes and configurations of ground systems, for various frequencies, ground constants, and elevation angles. It was shown that, in general, a ground screen of radius 250 feet produces an improvement of 3 to 9 dB on poor to fair soil (conductivity 10 millimhos per meter) at frequencies of 8 to 32 Mc/s. Improvement is greater with larger ground systems, higher frequencies, poorer soils, and at lower elevation angles. (Author)

AD-631 042 Fld. 20/14
CFSTI Prices: HC $5.60 MF $0.50
FORSVARETS FORSKNINGSINSTITUTT KJELLER (NORWAY)
LONG RANGE PROPAGATION STUDIES.
Annual summary rept. no. 1, 15 Sep 64-15 Jul 65,
by K. Folkestad. 10 Sep 65, 52p. Rept. no. Interim rept. E-64,
Contract AF 61 (052)-835,
AFCRL 66-11

Unclassified report

Descriptors: (*Ionospheric propagation, *Radio waves), Atmospheric sounding, Polar regions, Aurorae, Electromagnetic wave reflections, Information theory, Norway

This report describes activity associated with step-frequency oblique soundings in Norway. Pertinent operational parameters are given. Results from ray-path calculations and their relation to measured data are presented. The outcome from analysing different types of backscatter-echoes is offered. One of the chapters is devoted to a treatment of various characteristics of auroral radio-reflections. Another chapter deals with the communicational aspect of the experiment. Summary and conclusions are inserted in the final chapter. (Author)

AD-631 046 Fld. 20/14, 8/7
CFSTI Prices: HC $4.00 MF $0.75
INNSBRUCK UNIV (AUSTRIA)
ON THE PROPAGATION OF VLF WAVES IN SOLID MEDIA.
Final scientific rept.,
by Wolfram Bitterlich. Dec 65, 109p. Contract AF 61 (052)-490,
AFCRL 66-211

Unclassified report

Abstract in German.

Descriptors: (*Electromagnetic waves, Propagation), (*Electrical conductance, *Rock (Geology)), Very low frequency, Wave transmission, Solids, Underground antennas, Austria

In the present report, the propagation of VLF waves in solid media is described by theory and experiment for the near field and for the subsequent transition zone to the far field. The decisive parameters: conductivity, and dielectric constant are determined by independent methods of measurement. The required instruments, largely designed by our team, are described. The theory of a magnetic transmitting dipole is checked and modified by a number of measurements in regions of different geological conditions. (Author)

AD-631 047 Fld. 20/14, 4/1
CFSTI Prices: HC $1.10 MF $0.50
CHALMERS UNIV OF TECHNOLOGY GOTEBORG (SWEDEN) RESEARCH LAB OF ELECTRONICS
RESEARCH ON PROPAGATION OF HIGH POWER WAVES IN IONIZED MEDIA.
Final scientific rept.,
by O. E. H. Rydbeck. Jun 65, 10p. Rept. no. US-44,
Contract AF 61 (052)-451,
AFCRL 66-128

Unclassified report

Descriptors: (*Radio waves, Propagation), (*Plasma physics, Wave transmission), (*Ionospheric propagation, Radio waves), Electromagnetic wave reflections, Plasma oscillations, Atmospheric sounding

AD-631 063 Fld. 20/14, 9/5
CFSTI Prices: HC $1.00 MF $0.50
EMMANUEL COLL BOSTON MASS ORIENTAL SCIENCE LIBRARY
SUPPRESSION OF SIDE-LOBES OF LINEAR ARRAYS.
Research translation,
by L. Jen, and M. Y. Loo. Nov 65, 16p. Rept. no. Emm-65-8,
Contract AF 19 (628)-5073,
TT 66-61012

Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) v17 n12 p592-9 1961.

Descriptors: (*Antenna lobes, Reduction), (*Antenna arrays, Antenna lobes), Antenna radiation patterns, Distribution functions, Nonlinear systems, Phased arrays, China

AD-631 095 Fld. 20/14, 4/1, 20/9
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS
WHISTLER-HYDROMAGNETIC EXTENSION OF MAGNETOIONIC THEORY (REVISED).
Physical sciences research papers,
by Gideon Kantor. 25 Jun 65, 29p. Rept. no. AFCRL-66-172,AFCRL-PSRP-203
Proj. AF-4603, Task 460302,

Unclassified report

Revision of manuscript submitted 16 Mar 64. See also AD-430 051.

Availability: Published in Journal of Geophysical Research v70 n19 p4823-46 Oct 1 1965. Copies to DDC users only.

Descriptors: (*Whistlers, Magnetohydrodynamics), (*Ionospheric propagation, Whistlers), Atmospheric electricity, Mathematical analysis, Refractive index, Electron density, Electromagnetic waves

The study of the whistler-hydromagnetic extension of magnetoionic theory is based on exact derivations. The conductivity tensor formulation is reviewed. A resistivity tensor formulation that is derived is used to obtain a relatively simple wave polarization expression and an exact quadratic equation for the phase refractive index at ion gyrofrequency. A frequency slightly above the ion gyrofrequency is proposed as a condition for the transition between the whistler and hydromagnetic extensions. The four modes are defined from the two equal solutions of the transverse case. Standard curves and the corresponding phase refractive index surfaces are presented for protons. Although without apparent immediate practical application, being primarily of theoretical interest, the curves should encourage heuristic studies aimed at extending magnetoionic theory to whistler and hydromagnetic frequencies. (Author)

AD-631 170 Fld. 20/14, 4/1
CFSTI Prices: HC $3.00 MF $0.75
STANFORD RESEARCH INST MENLO PARK CALIF
HF COMMUNICATION EFFECTS: PROPAGATION IN THE HIGH-LATITUDE IONOSPHERE.
Final rept.,
by T. I. Dayharsh, J. B. Lomax, W. E. Blair, P.

L. Milic, and E. J. Baumann. Aug 65, 93p. Contract DA-36-039-sc-87197, Proj. SRI-3670, Task NWER-938/07.041, DASA 1700

Unclassified report

Descriptors: (*Radio communication systems, *Ionospheric propagation), (*High frequency, Radio communication systems), Atmospheric sounding, Radio waves, Propagation, Arctic regions, Radiofrequency interference, Magnetic storms, Ionospheric disturbances, Multipath transmission, Graphics

The interrelationships of particular high-latitude phenomena--E sub s, magnetic storms, complex ray paths, and field-aligned ionization--and HF oblique sounder observations from five paths for one year are analyzed in this report. Magnetic field deviations produced during magnetic storms were found to be highly correlated with ionospheric variations that occurred one to three hours after the magnetic variations. Equations relating the magnetic field variations to the ionospheric variations are developed in this report with generally favorable results. Prediction of E sub s oblique mode occurrences and MOFs from vertical sounder data is also presented in this report. The sounder data was used to plot maps of f sub o E sub s and percent occurrence. Good agreement is found between the observed oblique mode statistics on four paths and those predicted from the maps. Ray-tracing techniques were used to simulate the observed oblique ray paths from vertical -incidence sounder data taken along the oblique paths. It was found that ray-tracing techniques were remarkably accurate, considering the drastic variations in ionospheric parameters along the path. Ray-tracing techniques for modes using field-aligned ionization are also presented in this report. Time delays derived by these techniques fit remarkably well with statistics for the observed scatter-modes on two paths. (Author)

AD-630 532 See Fld. 20/3

AD-630 539 See Fld. 20/3

AD-631 011 See Fld. 4/1

AD-631 061 See Fld. 4/1

AD-631 164 See Fld. 9/3

Field 21-PROPULSION AND FUELS

21/1. AIR-BREATHING ENGINES

AD-630 764 Fld. 21/1, 21/5
CFSTI Prices: HC $1.00 MF $0.50
AEROSPACE TECHNOLOGY DIV LIBRARY OF CONGRESS WASHINGTON D C
PROBLEMS OF SPACE AIR-BREATHING JET ENGINES.
ATD work assignment no. 76,
by I. A. Merkulov. 17 Jan 66, 23p. Rept. no. ATD-66-8, TT 66-60934

Unclassified report

Trans. of Akademiya Nauk SSSR. Izvestiya. Energetika i Transport n5 p159-72 1965. Rept. on Surveys of Soviet Scientific and Technical Literature.

Descriptors: (*Air-breathing engines (Unconventional), Thrust), (*Jet engines, Performance (Engineering)), (*Thrust, Jet engines), (*Space propulsion, Jet engines), Thermodynamics, Space flight, USSR, Heat transfer, Diffusers, Gas flow

The paper presents the results of a thermodynamic investigation of an air-breathing jet engine (ABJE) in the 5-50 M range. It is intended to present general criteria for determining ABJE efficiency, i.e., to establish the ABJE thrust criteria, which would permit the determination of the engine's thrust capacity at given initial parameters without using gas dynamic calculations. Formulas for ABJE thrust criteria are given and it is demonstrated that these engines may develop a positive thrust at space flight speeds, if heat and an additional mass are introduced into the engine's air flow. The equivalence of the supplied mass of heat is established according to the engine thrust. It is demonstrated that the mass heat equivalent decreases as the flight speed increases. Calculated values of the specific impulse of an ABJE equipped with various types of diffusors at space flight speeds are given. The article is divided into six parts: Introduction, Mechanical energy losses in an ABJE diffusor, Engine with a heat supply, Engine with heat and mass supply, Specific impulse of space air breathing jet engines, and Conclusions. The foremost conclusion is that the air-breathing jet engine, with heat and additional mass fed into the air flow, can develop a positive thrust at space flight speeds. (Author)

21/2. COMBUSTION AND IGNITION

AD-630 634 Fld. 21/2, 7/4, 21/9
CFSTI Prices: HC $1.00 MF $0.50
AERONUTRONIC DIV PHILCO CORP NEWPORT BEACH CALIF
THERMODYNAMIC PROPERTIES OF PROPELLANT COMBUSTION PRODUCTS.
Quarterly letter rept. no. 2, 1 Sep-31 Dec 65, by N. D. Potter. 31 Dec 65, 8p. Rept. no. QLR-66-3,
Contract AF 49 (638)-1577,ARPA Order-31
AFOSR 66-0354

Unclassified report

See also AD-625 044.

Descriptors: (*Combustion products, Thermodynamics), (*Propellants, Combustion products), (*Rocket propellants, Thermodynamics), Aluminum, Heat of sublimation, Mass spectroscopy, Decomposition, Aluminum compounds, Carbides, Vapor pressure, Thermochemistry

The objective of this program is to provide thermodynamic data for species which are potentially important combustion products of advanced chemical rockets and for related species. Enthalpy and entropy data are obtained from equilibrium measurements made by torsion-free evaporation and torsion-effusion techniques and by high temperature mass spectrometry. (Author)

AD-630 829 Fld. 21/2, 7/2, 7/4
CFSTI Prices: HC $1.60 MF $0.50
DEFENSE RESEARCH LAB UNIV OF TEXAS AUSTIN
TEMPERATURE AND CONCENTRATION CHANGES IN THE REACTION OF HYDROGEN AND BROMINE IN VARIOUS GAS MIXTURES,
by Robbin C. Anderson. 12 Sep 49, 15p. Rept. no. CF-1350 ,DRL-227

Unclassified report

Descriptors: (*Flame propagation, Chemical reactions), (*Hydrogen, Flames), (*Bromine, Flames), Bromides, Synthesis (Chemistry), Temperature, Concentration (Chemistry), Thermochemistry, Reaction kinetics, Dissociation

In the various theories of flame propagation which are being checked against experimental results for hydrogen -bromine flames, such factors as the temperature and the concentrations of various reagents may be critical parameters. Calculations of such values were made using the accepted mechanism of reaction. Since later comparisons of theoretical and experimental data must be considered in terms of the uncertainties inherent in theoretical values, the methods of calculation and data used are outlined here. (Author)

AD-630 830 Fld. 21/2, 7/2, 7/4
CFSTI Prices: HC $1.60 MF $0.50
DEFENSE RESEARCH LAB UNIV OF TEXAS AUSTIN
RATE CONSTANTS FOR REACTIONS IN THE HYDROGEN-BROMINE SYSTEM,
by Robbin C. Anderson. 12 Sep 49, 20p. Rept. no. CF-1327 ,DRL-219

Unclassified report

Descriptors: (*Flame propagation, Chemical reactions), (*Hydrogen, Flames), (*Bromine, Flames), Bromides, Synthesis (Chemistry), Reaction kinetics, Equations, Thermochemistry, Heat of reaction, Heat of activation, Burning rate

An analysis was made of available rate data for the various atomic and molecular reactions occurring in the hydrogen-bromine system. Equations were determined for calculating the specific reaction velocity constants at different temperatures. (Author)

AD-630 831 Fld. 21/2, 7/2, 7/4
CFSTI Prices: HC $1.60 MF $0.50
DEFENSE RESEARCH LAB UNIV OF TEXAS AUSTIN
CALCULATIONS OF BURNING VELOCITIES FOR HYDROGEN-BROMINE MIXTURES: I. MALLARD-LE CHATELIER EQUATION,
by Robbin C. Anderson. 15 Sep 49, 17p. Rept. no. CF-1328 ,DRL-220

Unclassified report

Descriptors: (*Flame propagation, Chemical reactions), (*Hydrogen, Burning rate), (*Bromine, Burning rate), Bromides, Synthesis (Chemistry), Reaction kinetics, Equations, Thermochemistry, Temperature, Ignition, Density, Specific heat, Thermal conductivity

Experimental measurements were made of burning velocities in hydrogen-bromine mixtures of various types. Calculations are now being made to check against these data the predictions of certain theoretical equations for burning velocity. In this report results of calculations based on the thermal theory of Mallard and Le Chatelier are given. These are not in good agreement with experimental data. (Author)

AD-630 832 Fld. 21/2, 7/2, 7/4
CFSTI Prices: HC $2.60 MF $0.50
DEFENSE RESEARCH LAB UNIV OF TEXAS AUSTIN
CALCULATIONS OF BURNING VELOCITIES FOR HYDROGEN-BROMINE MIXTURES: II. SQUARE ROOT LAW (TANFORD AND PEASE),
by Robbin C. Anderson. 28 Mar 50, 22p. Rept. no. CF-1409 ,DRL-241

Unclassified report

See also AD-630 831.

Descriptors: (*Flame propagation, Chemical reactions), (*Hydrogen, Burning rate), (*Bromine, Burning rate), Bromides, Synthesis (Chemistry), Reaction kinetics, Equations, Thermochemistry, Combustion products, Concentration (Chemical), Diffusion, Additives

Results of calculations of burning velocities of hydrogen -bromine mixtures of various compositions and of the effects of certain diluents are reported. These results are compared with experimental data. (Author)

AD-631 104 Fld. 21/2, 7/4
LOUVAIN UNIV (BELGIUM)
KINETICS OF LAMINAR PREMIXED METHANE-OXYGEN -NITROGEN FLAMES,
by R. Burke, and A. Van Tiggelen. 19 May 65, 26p. Contract AF-EOAR-42-63, AFOSR 66-0056

Unclassified report

Availability: Published in Bulletin des Societes Chimiques Belges n74 p426-49 1965. Copies to DDC users only.

Descriptors: (*Flame propagation, Reaction kinetics), (*Methane, Burning rate), (*Oxygen, Burning rate), Nitrogen, Flames, Temperature, Hydrocarbons, Oxidation, Heat of reaction, Belgium

The velocity of flame propagation, the combustion gas temperature, and the reaction zone thickness was measured for more than three hundred mixtures of different combinations of methane-oxygen-nitrogen. This experimental study confirmed the results of investigations, made by other workers, on the structure of the reaction zone of flames propagated in these particular mixtures. It was possible to derive the apparent activation energy as well as the partial orders with respect to the fuel and to oxygen.

AD-631 159 Fld. 21/2, 19/4
CALIFORNIA UNIV BERKELEY
DYNAMICS OF THE GENERATION OF PRESSURE WAVES BY ACCELERATING FLAMES,
by P. A. Urtiew, A. J. Laderman, and A. K. Oppenheim. 1965, 10p. Contract AF-AFOSR-129-64,
AFOSR 66-0349

Unclassified report

Availability: Published in Symposium (International) on Combustion (10th) p797-804 1965. Copies to DDC users only.

Descriptors: (*Explosive gases, Flame propagation), (*Flames, Acceleration), Shock waves, Thermodynamics, Pressure

The theory of initial flame acceleration in an explosive gas contained in a constant cross-section tube, developed previously for a hemispherically shaped flame, was extended to include flames of spheroidal shapes. An expression for the flame world-line was developed, which depends only on a single parameter that accounts for the effects of the thermodynamic properties of the mixture and the geometry of the flamefront. Its value is determined graphically on the basis of experimental data. This leads to an unambiguous technique for the evaluation of the relative flame-propagation speed and for the calculation of the pressure wave generated by the flame. (Author)

AD-630 912 **See Fld. 21/9**

AD-630 920 **See Fld. 21/8**

21/3. ELECTRIC PROPULSION

AD-630 703 **See Fld. 20/9**

21/4. FUELS

AD-630 641 Fld. 21/4, 21/8
CFSTI Prices: HC $2.00 MF $0.50
OHIO STATE UNIV COLUMBUS ROCKET RESEARCH LAB
DETONABILITY OF COMBUSTIBLE MIXTURES,
by Loren E. Bollinger. 1965, 34p. Contract AF-AFOSR-203-65,
AFOSR 66-0342

Unclassified report

Presented at the Annual National Conference on Environmental Effects on Aircraft and Propulsion Systems (5th), Princeton, N. J., 20-22 Sep 65.

Descriptors: (*Detonations, Fuels), (*Fuels, Detonation waves), (*Aviation fuels, Combustion), Aircraft fires, Mixtures, Rocket propellants, Combustion chambers, Lightning, Flames, Reviews, Propagation

A limited review is given of experimental and theoretical research on the formation of detonation waves in combustible gaseous mixtures. The initiation, propagation, and transition problems were studied in some detail.

AD-630 768 Fld. 21/4
CFSTI Prices: HC $5.00 MF $1.00
BUREAU OF MINES BARTLESVILLE OKLA PETROLEUM RESEARCH CENTER
STORAGE STABILITY OF HIGH TEMPERATURE FUELS.
Rept. for Feb 65-Feb 66,
by M. L. Whisman, and C. C. Ward. Feb 66, 183p. Contract AF (33-615)-64-1009, Proj. AF-3048, Task 304801,
AFAPL TR-65-13-Pt-2

Unclassified report

See also AD-612 468.

Descriptors: (*Jet engine fuels, *Storage), (*Petroleum, Thermal stability), Tracer studies, Radioactive isotopes, Deposition, Tritium, Hydrogenation, Hydrocarbons, Catalysts, Borohydrides, Proportional counters

The report covers the second year's work on an investigation of the influence of fuel constituents on thermal stability during storage of Spec MIL-J-25656B type (JP-6) and other high temperature fuels. Ninety-four test blends representing 12 fuels and 9 radioactive fuel components were prepared, tested and stored at 130F in the evaluation of a microscale thermal stability procedure developed for the purpose of determining the contribution of selected fuel components to thermally induced deposits. Sixty-four of these test blends reached 26 weeks storage interval and were retested to determine the effect of storage upon deposit-forming tendencies. A study of several variables associated with a dynamic microhydrogenation method using tritium as the index of reactivity was completed. Final investigations with a series of test fuels and pure hydrocarbons concluded the application of the technique. An alternate static system of hydrogenation utilizing active metal catalysts prepared by the in situ treatment of the metal salt with sodium borohydride, and the in situ generation of hydrogen from sodium borohydride was completed. A revised procedure employing tritium labeled borohydride was likewise developed and evaluated. (Author)

AD-630 878 Fld. 21/4
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
METHOD OF ANALYSIS OF MICROCONTAMINATIONS AND RESIDUES IN MEDIUM DISTILLATE FUELS,
by Ya. B. Chertkov, N. I. Marinchenko, and V. N. Zrelov. 21 Jan 66, 10p. Rept. no. FTD-TT-65-1648,
TT 66-60971

Unclassified report

Unedited rough draft trans. of Neftepererabota i Neftekhimiya (USSR) n11 p16-8 1963.

Descriptors: (*Fuels, Analysis), (*Petroleum, Impurities), Contamination, Deposition, Separation, Moisture, Fluid filters, USSR

A method was developed for the systematic analysis of the microcontaminations in average distillate fuels and residues which are formed in the fuel and deposited on the filtering elements and mechanisms of the fuel units. The method enables one to determine the amount and elementary composition of the organic and ash portions of the microcontaminations and residues, their ash and structural moisture, and, consequently, to judge of the causes of the clogging of filters, sources of formation of deposits on parts of the fuel regulating equipment as well as to evaluate the character of the contamination of the fuels in the process of storage and transportation. (Author)

AD-630 828 **See Fld. 21/5**

AD-630 889 **See Fld. 13/11**

21/5. JET AND GAS TURBINE ENGINES

AD-630 685 Fld. 21/5
CFSTI Prices: HC $6.60 MF $0.75
DAVID TAYLOR MODEL BASIN WASHINGTON D C
ON CERTAIN PROBLEMS OF WATER JET PROPULSION,
by S. Schuster, H. Schwanecke, R. Dernedde, M. Schmiechen, and H. J. Schwechheimer. Aug 62, 66p. Rept. no. Translation-306,
TT 66-60911

Unclassified report

Trans. of mono. Uber Probleme des Wasserstrahlantriebs, 1960, p195-232.

Descriptors: (*Jet propulsion, Underwater propulsion), (*Hydrojet engines, Scientific research), Jets, Water, Propellers (Marine), West Germany, Theory, Mathematical models

The report presents a series of lectures on problems of water jet propulsion given by five prominent scientists at the Research Institute of Hydraulic Engineering and Shipbuilding in Berlin. The lectures include an introduction to the problem of jet propulsion, preliminary investigations, theoretical formulations, and a consideration of various types of jet propulsion. (Author)

AD-630 742 Fld. 21/5, 13/10
CFSTI Prices: HC $2.00 MF $0.50
DEPARTMENT OF THE NAVY WASHINGTON D C
BASIC RESULTS OF TESTING THE FIRST SOVIET GAS TURBINE INSTALLATION (GTU-20) FOR OCEANGOING SHIPS,
by A. G. Kurzon. 1966, 40p. Rept. no. Translation-2030,
TT 66-60932

Unclassified report

Osnovnye Rezultaty Ispytanii Pervoi Otchestvennoi Gazoturbinnoi Ustanovki (GTU-20) dlya Morskikh Sudov, trans. of Sudostroenie (USSR) n7 p22-36 Jul 1965.

Descriptors: (*Ship turbines, USSR), (*Gas turbines, Marine propulsion), Tests, Temperature, Fuel consumption

A gas turbine engine was developed for oceangoing vessels with a power reaching 13000 hp, which possesses a high degree of reliability, excellent maneuvering characteristics, is economical and light, satisfies the new standards of the State Sanitary Inspection Service for noise characteristics, possesses a high degree of automation and is remote controlled. The GTU-20 was designed for operation with a variable pitch propeller but can also be used with other reversing systems. Comparison with the best foreign-built gas turbine units on seagoing ships indicates that the GTU-20 surpasses them in terms of basic characteristics. The less consumption of fuel in the GTU-20, than in the GTU of the British tanker AURIS is explained by the fact that in the GTU-20 the gas temperature is 100C higher. The GTU-20 also proved to be more economical than the similar installation on the dry cargo ship JOHN SERGEANT, even though in the latter the gas turbine temperature was 40C higher; here the advantages of the system with intermediate air cooling are evident.

AD-630 826 Fld. 21/5, 14/2, 20/4
CFSTI Prices: HC $2.00 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
RAMJET TECHNOLOGY. CHAPTER 13. FACILITIES AND TESTING.

217-041 O-66—6

Technical memo.,
by H. F. Kirk. May 65, 42p. Rept. no. TG-610-13,
Contract NOw-62-0604-c,
Unclassified report

Descriptors: (*Jet propulsion, Test facilities), (*Ramjet engines, Test facilities), (*Aeronautical laboratories, Ramjet engines), (*Aerodynamics, Test facilities), Wind tunnels, Instrumentation

CONTENTS: Wind tunnels - external aerodynamics and inlet testing; the free-jet facility; connected-pipe testing - combustors and nozzles; facility components; air supply, air heating, free-jet nozzles, exhaust systems, facility controls; Structural Test Facilities; Hypersonic Testing; and Flight Testing.

AD-630 827 Fld. 21/5, 1/1
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
RAMJET TECHNOLOGY. CHAPTER 10. PRELIMINARY DESIGN FOR SUPERSONIC FLIGHT.
Technical memo.,
by James H. Walker. Feb 66, 100p. Rept. no. TG-610-10,
Contract NOw-62-0604-c,
Unclassified report

Descriptors: (*Ramjet engines, *Supersonic flight), (*Supersonic planes, Ramjet engines), (*Aerodynamics, Ramjet engines), Jet propulsion, Rocket propulsion, Aeronautics, Experimental design

This chapter is concerned with engine selection and optimization for supersonic flight, in particular, the factors influencing the application of the ramjet engine. It is possible, for preliminary design and engine comparison purposes, to reduce a large number of supersonic flight variables to a relatively few terms that describe the airframe and powerplant and that may be readily estimated. These parameters are valuable in outlining general regions of interest, and they furnish considerable insight into various problems in application. Although the primary emphasis throughout the chapter is on these general fundamental design parameters, the three specific configurations of ramjets are discussed. Finally, a comparison of ramjets and rocket powerplants is made. This TG is one of a series of reports representing individual Chapters of a forthcoming book entitled 'Ramjet Technology'. (Author)

AD-630 828 Fld. 21/5, 21/4
CFSTI Prices: HC $3.00 MF $0.75
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
RAMJET TECHNOLOGY. CHAPTER 8. AIR-FUEL MIXTURE PREPARATION.
Technical memo.,
by Malcolm A. Weiss, and John H. Morgenthaler. Jan 66, 91p. Rept. no. TG-610-8,
Contract NOw-62-0604-c,
Unclassified report

See also AD-630 330.

Descriptors: (*Ramjet engines, *Fuel injection), Air, Jet engine fuels, Mixtures, Liquids, Atomization, Evaporation, Combustion

Liquid fuels must undergo atomization, mixing, and evaporation before combustion occurs. It is convenient to consider these processes separately, but this separation should not obscure the fact that the processes usually occur concurrently rather than consecutively. None of the three is understood well enough for rigid design of practical combustors from first principles. However, enough is known to guide the designer in improving existing combustor systems, as well as for establishing new designs. The three processes are discussed in detail in this chapter. (Author)

AD-630 849 Fld. 21/5, 20/13
CFSTI Prices: HC $1.60 MF $0.50
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C
HEAT TRANSFER TO THE SURFACE OF GAS TURBINE BLADES,
by E. R. Plotkin, and E. I. Molchanov. Feb 66, 15p. Rept. no. FSTC-HT-23-33-66,
Proj. 2301-6553,
TT 66-60954
Unclassified report

Trans. of Teploenergetika (USSR) n11 p72-4 Nov 1964.

Descriptors: (*Gas turbine blades, *Heat transfer), Surfaces, Gas turbines, Heat transfer coefficients, USSR

The article studies heat transfer to the surface of gas turbine blades on the basis of experimental data for a nonstationary blade temperature field obtained by the authors during experimental investigation of various transient regimes of an operating gas turbine engine. According to the authors the literature hitherto contained no data on the coefficients of heat transfer to blades under actual gas-turbine operating conditions. (Author)

AD-631 172 Fld. 21/5
CFSTI Prices: HC $1.00 MF $0.50
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C
INCREASING THE EFFICIENCY OF TURBINE EXHAUST PIPE,
by D. I. Morozov. Apr 66, 12p. Contract DA-44-009-AMC-1563 (T), Proj. DA-1M643324D-590,
AERDL T-1834-66 ,TT 66-61030
Unclassified report

Trans. of Energomashinostroenie (USSR) v11 n5 p35-7 1965.

Descriptors: (*Exhaust pipes, Effectiveness), (*Gas turbines, Exhaust pipes), Helixes, Diffusers, Design, Combustion products, Gas flow, Axially symmetric flow, USSR

The two spirals of the helix-- on the left and right sides--create two circulations of opposing direction, which are transmitted into an axially radial diffuser and lead to the formation, on the larger part of the circumference, of a nonradial, axially assymmetrical flow discharge from the diffuser. As a result, the effective degree of the expansion of the diffuser is diminished, and the pressure increase in it is reduced. Therefore, for a given exhaust area of the helix, it is more efficient to increase the transverse radial dimensions of the helix at the expense of the axial dimensions and thus to bring velocity field at the diffuser outlet closer to the radial direction with axial symmetry.

AD-630 764 **See Fld. 21/1**

21/8. ROCKET MOTORS AND ENGINES

AD-630 825 Fld. 21/8
CFSTI Prices: HC $2.60 MF $0.50
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
OPTIMAL COMBINATION OF PROPULSION SYSTEMS,
by Yu. N. Ivanov. 15 Feb 66, 28p. Rept. no. TG-230-T464,
Contract NOw-62-0604-c,
TT 66-60938
Unclassified report

Trans. of Akademiya Nauk SSSR. Izvestiya, Mekhanika i Mashinostroenie n2 p9-18 1964.

Descriptors: (*Space propulsion, *Optimization), Calculus of variations, Thrust vector control systems, USSR

If two or more propulsion systems are jointly installed on a space vehicle, it is necessary to know the conditions of their optimal combination. In the paper there is considered a method of solving the variational problem of the optimal combination of arbitrary propulsion systems, and a study is made of the problem of the optimal combination of engines of limited exhaust velocity with engines of limited power. The weight of an engine of limited exhaust velocity is considered as being proportional to the maximum thrust; the weight of an engine with limited power is assumed in one case to be proportional to the maximum power, and in another case to be equal to the sum of two terms, one of which is proportional to the maximum power and the other to the maximum thrust. (Author)

AD-630 641 **See Fld. 21/4**

21/8.2 SOLID ROCKET MOTORS

AD-630 920 Fld. 21/8.2, 21/2
CFSTI Prices: HC $5.60 MF $0.50
THIOKOL CHEMICAL CORP ELKTON MD
AN EXPERIMENTAL INVESTIGATION OF SOME OF THE ACOUSTIC ATTENUATION SOURCES IN THE TE-M-388 (IROQUOIS) ROCKET MOTOR.
Scientific rept. no. 2, Feb 65-Jan 66,
by John W. Edwards, and John Mallick. 25 Feb 66, 55p. Rept. no. E37-66,
Contract AF 19 (628)-4068, Proj. AF-7659, Task 765904,
AFCRL 66-178
Unclassified report

Descriptors: (*Rocket motors (Solid propellant), *Acoustics), (*Combustion, Solid rocket propellants), Simulation, Shock tubes, Rocket models, Sound, Attenuation, Rocket igniters

A series of experiments was performed in a TE-M-388 motor to determine the acoustic attenuation resulting from the propellant, the headcap, and the igniter. Several different headcap and igniter configurations were evaluated to determine the effect of such changes. A shock tube technique was used to generate an acoustic pulse in a simulated rocket motor; the amplitude of consecutive reflections of the acoustic wave was measured, and the acoustic absorption coefficient was calculated for each configuration. A supplemental series of experiments was performed to determine the complex storage and loss shear modulus for the TE-M-388 propellant, TP-H-3117. The test results showed that the use of a potting compound 'energy damper' in the headcap had a significant detrimental effect on the gross attenuation. The energy absorbed by the propellant appeared to be insignificant and there were no significant differences in the attenuating characteristics of the various igniters. (Author)

21/9. ROCKET PROPELLANTS

AD-630 634 **See Fld. 21/2**

AD-630 945 **See Fld. 7/3**

21/9.2 SOLID ROCKET PROPELLANTS

AD-630 912 Fld. 21/9.2, 21/2
CFSTI Prices: HC $25.00 MF $1.25
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF FUEL SCIENCE
COMBUSTION BEHAVIOR OF THERMOPLASTIC POLYMER SPHERES.
Technical rept. (Master's thesis),
by R. H. Essenhigh, and W. L. Dreier. Mar 66, 254p. Rept. no. FS66-1,
Contract Nonr-656 (29)
Unclassified report

Descriptors: (*Hybrid rocket propellants, Combustion), (*Thermoplastics, Combustion), Spheres, Solid rocket propellants, Polymers, Polyethylene plastics, Propenes, Styrene plastics, Acrylic resins, Polyamide plastics, Butadienes, Burning rate, Vinyl plastics, Cellulose acetates

The investigation was undertaken to study the combustion behavior of 11 thermoplastic polymer spheres burning in air. They were photographed during combustion so that burning rates could be obtained and compared to calculated values determined through the use of appropriate mass and heat transfer equations. The rates were used as a means of determining whether the polymer sphere combustion system could be compared to the more complex combustion system involved in hybrid rockets that employer polymers as fuels. The polymers appeared to burn in two stages. Polymers with a low carbon content burned almost entirely in a volatile stage, characterized by a bright diffusion flame established at some distance from the polymer sphere surface. At volatile burnout, a small amount of residue remained that burned away too rapidly to be measured. The polymers with a high carbon content burned with a quick volatile combustion stage, leaving a carbonaceous residue that burned away slowly with a bright red glow. The volatile burning times, for polymer spheres 0.5 to 1.5 mm in diameter, were between 0.1 and 2.0 seconds while the residue burning times ranged between 1 and 30 seconds.

Field 22-SPACE TECHNOLOGY

22/1. ASTRONAUTICS

AD-630 807 Fld. 22/1, 22/2
CFSTI Prices: HC $3.00 MF $0.75
AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB OHIO
MAINTENANCE IN A WEIGHTLESS ENVIRONMENT.
Technical paper,
by Chester B. May. 1965, 60p.
Unclassified report

Descriptors: (*Space maintenance, Space tools), (*Weightlessness, Performance (Human)), Space environmental conditions, Spacecraft, Space simulation chambers, Astronauts, Specifications, Mathematical models, Partial differential equations, Functions, Equations of motion, Design

Design criteria evolved through tests in simulated zero-g environments enabled the development of techniques, equipment, and tools for space maintenance and the study of man's work ability under weightless conditions. Evaluations of the test data are encouraging in the prediction of a practical space maintenance capability. However, because of the combined effects of extended time in space, the spacecraft performance in flight, and the space environment, conclusions based on laboratory tests must be verified by experimentation on test beds designed for extended space operations. Refinements to the prototype techniques, equipment, and tools are certainly anticipated after the evaluation of these in -space tests.

AD-630 879 Fld. 22/1, 6/19, 6/11
CFSTI Prices: HC $1.00 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
LATEST ACHIEVEMENTS OF SOVIET SCIENCE IN THE CONQUEST OF SPACE,
by Zbigniew Jethon. 21 Jan 66, 20p. Rept. no. FTD-TT-65-1704, TT 66-60972
Unclassified report

Edited trans. of Wojskowy Przeglad Lotniczy (Poland) v19 n8 p48-59 1965.

Descriptors: (*Astronautics, USSR), Space flight, Manned, Astronauts, Space environmental conditions, Confined environments, Life support, Telemeter systems, Miniature electronic equipment, Acceleration tolerance, Vibration, Weightlessness, Vestibular apparatus, Stress (Physiology), Stress (Psychology), Motivation, Pressure suits, Space medicine

AD-630 890 Fld. 22/1
CFSTI Prices: HC $14.60 MF $1.00
SYSTEMS ENGINEERING GROUP RESEARCH AND TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
A STUDY OF THE EFFECT OF MAN'S MOTION ON THE ATTITUDE AND ORBITAL MOTION OF A SATELLITE.
Technical rept., Sep 64-Mar 65,
by Corrado R. Poli. Dec 65, 147p. Rept. no. SEG-TR-65-41,
Proj. AF-7184, Task 718405,
Unclassified report

Descriptors: (*Satellites (Artificial), Motion), (*Astronauts, Motion), Orbital trajectories, Satellite attitude, Mathematical models, Equations of motion, Astronautics, Velocity

A mathematical model is developed and used for investigating the effects of man's motion on the attitude and orbital motion of an earth satellite. The model is obtained by writing the translational and rotational equations of motion for a rigid-body vehicle containing interconnected moving parts and then reducing these equations to a system consisting of a rigid-body satellite and a 'point mass' man. For the particular portion of the model concerned with the perturbations in the satellite attitude, the equations obtained are found to be independent of the orbit of the vehicle. The solution to the system of equations is primarily restricted to the case determining the disturbance of a given satellite due to an astronaut walking on the surface. It is shown here that the disturbance of the attitude, due to man's motion, is of greater importance than the disturbance due to gravity gradient while the disturbance of the satellite orbit is of the same order of magnitude as that duc to the oblateness of the earth. Except for some special cases which contain closed form solutions, the general equations are solved on an analog computer. In all cases studied, the magnitude of the constraint force between the astronaut and the spacecraft is seen to be small. However, the changes in the angular velocity and attitude of the vehicle are shown to be significant. Unlike the attitude of the vehicle, the orbit of the center of mass of the satellite is found not to be seriously affected by man's motion. (Author)

AD-630 630 **See Fld. 20/4**

22/2. SPACECRAFT

AD-630 901 Fld. 22/2, 20/13
CFSTI Prices: HC $2.60 MF $0.50
ARNOLD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN
SCALING OF ISOTHERMAL SIMPLE-SHAPED BODIES IN A TRANSIENT TEMPERATURE ENVIRONMENT,
by D. L. Adkins. Apr 66, 24p. Rept. no. AEDC-TR-66-21,
Contract AF 40 (600)-1200, Proj. SA0412,
Unclassified report

Prepared in cooperation with ARO, Inc., Tullahoma, Tenn.

Descriptors: (*Models (Simulations), Scale), (*Thermal analysis, Geometric forms), (*Spacecraft, Models (Simulations)), Thermodynamics, Simulation, Spacecraft components, Flat plate models, Spheres, Cylindrical bodies, Aluminum, Surface temperatures

Thermal modeling was performed with a flat plate, sphere, and cylinder. These aluminum bodies were located in a relatively close array. Electrical resistance heaters in the plate and sphere provided the external heat sources. The temperature distributions on the body surfaces were small enough to permit an isothermal assumption. A theoretical design analysis of the system was conducted and is discussed. Chamber testing consisted of eight continuous hours of 2-hr intervals of heating and cooling cycles in a pressure range of 0.0000001 torr. (Author)

AD-630 932 Fld. 22/2, 16/4, 13/12
CFSTI Prices: HC $24.30 MF $1.25
ATLANTIC RESEARCH CORP ALEXANDRIA VA
DEVELOPMENT OF THE FRANGIBLE ARCAS METEOROLOGICAL ROCKET VEHICLE.
Final rept., Apr 64-Dec 65,
by George K. Oss. 15 Feb 66, 247p. Rept. no. ARC-TRPL-8895,
Contract AF 19 (628)-4033, Proj. AF-6670, Task 667003,
AFCRL 66-157
Unclassified report

Descriptors: (*Sounding rockets, *Destructors), (*Fragmentation, Sounding rockets), Brittleness, Rockets, Safety devices, Demolitions, Particle size, Kinetic energy, Impact shock, Flight testing, Captive tests

Development of the Frangible ARCAS vehicle was successfully completed and demonstrated during this program. Two of seven static tests completed during this program, designated Phase II, included successful fragmentation of the spent rocket motor assembly to particle sizes yielding kinetic impact energy levels less than 3.0 ft-lbs. Further analysis showed that maximum energy levels of 1.5 ft-lbs. could be achieved with the existing configuration with only minor modification of the nozzle section. Four flight tests were conducted during the program, two of which included all systems. The initial tests established the flight temperature environment experienced by the explosive fragmentation system. The first systems flight was considered a 'No Test' because of a malfunction induced by the government modified launcher. The final flight test successfully demonstrated vehicle performance, payload ejection at apogee and subsequent vehicle fragmentation as programmed. This flight test fulfilled the primary objective of the program by demonstrating the feasibility of a frangible meteorological rocket system. (Author)

AD-630 976 Fld. 22/2, 3/2
CFSTI Prices: HC $1.10 MF $0.50
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO
ZOND-3 -UNIVERSAL SCOUT OF THE UNIVERSE-
20 Jan 66, 6p. Rept. no. FTD-TT-65-1502, TT 66-60992
Unclassified report

Unedited rough draft trans. from Pravda Vostoka (USSR) 25 Aug p3 1965.

Descriptors: (*Lunar probes, USSR), Space environmental conditions, Lunar environment, Photographic analysis

A popularized account is given of experiments performed by Zond-3, the probe which carried out the second successful Soviet attempt to photograph the reverse side of the moon.

AD-631 131 Fld. 22/2, 22/3
CFSTI Prices: HC $1.10 MF $0.50
RAND CORP SANTA MONICA CALIF
AN HELIOCENTRIC EARTH ORBIT PRECURSOR PLANETOID,
by A. I. Robinson. 1 Apr 66, 9p. Rept. no. P-3343,
Unclassified report

Descriptors: (*Space probes, *Solar satellites), Astronautics, Sun, Orbital trajectories, Scientific satellites, Astrophysics

The paper sets down some preliminary thoughts on the desire and need for an Heliocentric Earth Orbit Precursor Satellite.

AD-630 781 See Fld. 8/5

AD-630 807 See Fld. 22/1

AD-631 061 See Fld. 4/1

AD-631 182 See Fld. 5/8

22/3. SPACECRAFT TRAJECTORIES AND REENTRY

AD-631 128 Fld. 22/3
POLYTECHNIC INST OF BROOKLYN FARMINGDALE N Y
OPTIMUM ORBITAL TRANSFER BY TWO IMPULSES OF UNEQUAL SPECIFIC IMPULSE,
by Mauro Pierucci. 1 Mar 65, 6p. Contract AF-AFOSR-1-63, AFOSR 66-0622

Unclassified report

Availability: Published in Astronautica Acta v11 n4 p268-70 1965. Copies to DDC users only.

Descriptors: (*Optimization, *Transfer trajectories), Circular orbit trajectories, Elliptical orbit trajectories, Specific impulse

This note consists of a study of optimization of transfer from a circular to a non-intersecting elliptical orbit with the use of two impulses, where the two specific impulses are, in general, different. This occurs in transfers between orbits where staging may take place wherein two different engines (liquid and solid fuel) are used for the first and second impulse. The planar transfer which is treated in this paper may be considered to be the optimum case for the noncoplanar problem where the angle between the two orbits is not specified. The results obtained in this paper are a generalization of those obtained in the case where the ratio of the first to the second specific impulse is equal to one.

AD-630 801 See Fld. 14/2

AD-630 862 See Fld. 12/2

AD-631 131 See Fld. 22/2

How To Use Indexes To TAB Portion Of

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS

SUBJECT INDEX

The Subject Index is arranged alphabetically by asterisked descriptors from the document announcements in the TAB. Each announcement contains one or more asterisked descriptors which identify the main subjects of the report. The asterisked descriptor may or may not have a modifying descriptor appearing directly below the asterisked descriptor. Under each descriptor entry in the Subject Index appear the following items of information: annotation, AD number, and field/group. A typical subject index entry is shown below.

*ALUMINUM
GLASS TEXTILES
INVESTIGATION OF GLASS-
METAL COMPOSITE MATERIALS
AD-619 773 FLD. 11/7

PERSONAL AUTHOR INDEX

The Personal Author Index is arranged alphabetically by the last names of the authors of reports. When several report entries are given for one author, the entries are arranged numerically by AD number. Field/group and titles are also listed. Three asterisks serve as a separator between entries for reports under the same author. A typical personal author entry is shown below.

*CHASE, JOHN W.
* * *
THE LANTHANUM, EUROPIUM,
AND DYSPROSIUM CONTENTS OF
TWO TEKTITES
AD-619 828 FLD. 8/7
* * *
A PROCEDURE FOR GEOCHEMICAL
INTERPRETATION OF TERRESTRIAL
RARE-EARTH ABUNDANCE PATTERNS
AD-619 834 FLD. 8/7

CORPORATE AUTHOR-MONITORING AGENCY INDEX

The Corporate Author-Monitoring Agency Index is arranged alphabetically by corporate authors and monitoring agencies.

In the corporate author entry for each document are listed the originator of the report, the originator's report number, the title, AD number, and field/group. If the source has listed a monitoring agency in the report, the monitor acronym and monitor series number are given in parenthesis directly under the title. An IDEP (Interservice Data Exchange Program) report number is presented in the same way. A typical corporate author entry is shown on the next page.

216-354 O - 66 - 7

*AEROJET- GENERAL CORP AZUSA
CALIF

* * *

TR3015
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
(AFOSR 65-1058)
AD-619 513 FLD. 7/4

The three asterisks serve as a separator between entries for reports under the same corporate author.

When a report lists a monitoring agency, a corresponding entry is provided under the name of the monitoring agency, which appears in alphabetical order among the corporate author entries. In a monitoring agency entry, the report number is given above the title in place of the originator's report number. A typical monitoring agency entry is shown below.

*AIR FORCE OFFICE OF SCIENTIFIC
RESEARCH WASHINGTON D C

* * *

65-1058
STUDY OF THE REACTION
OF PENTABORANE WITH HYDRAZINE
AND SUBSTITUTED HYDRAZINES
AD-619 513 FLD. 7/4

CONTRACT INDEX

The Contract index is arranged alphanumerically by contract number. Within a contract grouping, each entry contains corporate author, series number (if any), monitor number (if any), AD number, and field/group.

When there are multiple document entries under one contract number, entries are arranged by AD number under each corporate author represented.

A contract entry may also contain a letter F, A, or S on the left-hand margin, indicating that the document is a Final, Annual, or Summary report. A typical contract entry is shown below.

*AF19 628 5167
LINCOLN LAB MASS INST OF TECH
LEXINGTON
(ESD TDR-65-315)
AD-619 580 FLD. 9/5
(ESD TDR-65-309)
AD-619 708 FLD. 3/1

REPORT NUMBER INDEX

The Report Number Index lists identifying numbers assigned either by the document originators or by the sponsors of the work described in the documents. The AD number and field/group location in TAB are given for each report number. If both the originator and the sponsor of a document have assigned identifying numbers, listings for both will appear in the respective alphanumeric positions.

In certain cases accession numbers are also given with the corresponding AD numbers and TAB locations; for instance, the IDEP (Interservice Data Exchange Program) reports and the CFSTI-TT reports (Technical Translations from the Clearinghouse for Federal Scientific and Technical Information).

CCL-183	
AD-620 154	FLD. 11/9
CRSR-203	
AD-620 250	FLD. 3/1
DPS-1677	
AD-469 558	FLD. 19/1A

AD-FIELD INDEX

The AD-Field Index is arranged numerically by AD number and lists the field/group where the full entry can be located in TAB.

SUBJECT INDEX

The fields/groups indicated here apply only to the Technical Abstract Bulletin Section (on white paper).

•ABLATION
THERMODYNAMICS
THE THERMODYNAMICS OF THE MAGNESIA/MAGNESIUM-OXYGEN VAPOR SYSTEM.•
AD-630 919 FLD. 11/2

•ACCELERATION
NYSTAGMUS
ELICITATION OF HORIZONTAL NYSTAGMUS BY PERIODIC LINEAR ACCELERATION.•
AD-630 997 FLD. 6/19

VISUAL PERCEPTION
OTOLITH SHEAR AND THE VISUAL PERCEPTION OF FORCE DIRECTION: DISCREPANCIES AND A PROPOSED RESOLUTION.•
AD-630 996 FLD. 6/19

•ACCELERATION TOLERANCE
EAR
TRANSLATION OF RUSSIAN RESEARCH: HISTOMORPHOLOGICAL CHANGES IN THE INTERNAL EAR OF DOGS UNDER THE EFFECT OF RADIAL ACCELERATIONS.
AD-630 991 FLD. 6/19

HUMANS
AN INVESTIGATION OF THE RELATIONSHIP BETWEEN EXPERIENCE PARAMETERS AND SUBJECT ACCELERATION RESPONSE IN EXPERIMENTAL IMPACT.
AD-630 788 FLD. 6/19

•ACCIDENTS
SUBMARINES
OVERCOMING SUBMARINE CONTROL - SURFACE JAMS AND FLOODING CASUALTIES,•
AD-630 829 FLD. 13/10.1

•ACKENES
STEREOCHEMISTRY
REPRINT: MOLECULAR ASYMMETRY OF OLEFINS. V. RESOLUTION OF CIS,TRANS- 1,3-CYCLOOCTADIENE.
AD-630 720 FLD. 7/3

•ACOUSTIC PROPERTIES
TURBULENCE
THE NEAR-SOUND FIELD OF TURBULENCE,•
AD-630 689 FLD. 20/1

•ACOUSTICS
ARCTIC OCEAN
SEISMOMETERS ON ARCTIC ICE FOR DETECTION OF UNDERWATER ACOUSTIC DISTURBANCES.•
AD-631 080 FLD. 20/1

CAVITATION
CAVITATION DYNAMICS: I. A MATHEMATICAL FORMULATION.•
AD-631 016 FLD. 20/1

ROCKET MOTORS(SOLID PROPELLANT)
AN EXPERIMENTAL INVESTIGATION OF SOME OF THE ACOUSTIC ATTENUATION SOURCES IN THE TE-M-388 (IROQUOIS) ROCKET MOTOR.•
AD-630 920 FLD. 21/8.2

SEISMIC WAVES
REPRINT: REFLECTION AND REFRACTION OF ELASTIC WAVES AT A CORRUGATED INTERFACE.
AD-631 139 FLD. 8/11

SONIC BOOM
A STUDY OF METHODS FOR EVALUATING SONIC BOOM EFFECTS,•
AD-631 003 FLD. 20/1

TRANSDUCERS
COMPUTATION OF TRANSDUCER VELOCITIES FOR VERY LARGE TRANSMITTING ARRAYS.•
AD-630 991 FLD. 20/1

•ACRYLIC RESINS
FLUID FLOW
NON-NEWTONIAN FLOW OF DILUTE POLYMETHACRYLIC ACID SOLUTIONS AT DIFFERENT DEGREES OF NEUTRALIZATION AND IONIC STRENGTHS.•
AD-630 669 FLD. 7/9

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•AF 33(615)-1906
ITT INDUSTRIAL LABS FORT WAYNE IND
(AMRL-TR-65-218)
F AD-630 905 FLD. 17/2

•AF-33(615)-2210
MASSACHUSETTS INST OF TECH
CAMBRIDGE ENGINEERING PROJECTS
LAB
DSR-5393-3
(AFFDL-TR-65-229)
AD-630 790 FLD. 13/7

•AF 33(615)-2766
TORONTO UNIV (ONTARIO) INST FOR
AEROSPACE STUDIES
UTIAS-REVIEW-26
AD-631 065 FLD. 14/2

•AF 33(615)-3149
SYSTEMS RESEARCH LABS INC DAYTON
OHIO
(AMRL-TR-65-238)
F AD-630 941 FLD. 17/2

•AF 33(615)-3306
RESEARCH TRIANGLE INST DURHAM N C
(ASD-TDR-63-316-VOL-8)
AD-630 899 FLD. 9/5

•AF 33(616)-2631
RCA LABS PRINCETON N J
(ARL-TR-60-284)
AD-631 188 FLD. 9/1

•AF 33(616)-3472
MARTIN CO BALTIMORE MD
ENGINEERING-11994
AD-630 880 FLD. 5/8
ENGINEERING-11994-2
AD-630 881 FLD. 5/8

•AF 33(657)-9842
MIAMI VALLEY HOSPITAL DAYTON OHIO
DEPT OF RESEARCH
(AMRL-TR-65-173)
F AD-630 594 FLD. 6/20

•AF 33(657)-10509
MARTIN CO BALTIMORE MD
(AFML-TR-66-2)
AD-630 661 FLD. 11/6
(AFML-TR-66-4)
S AD-630 949 FLD. 11/6

•AF 33(657)-10763
OHIO STATE UNIV RESEARCH FOUNDATION
COLUMBUS LAB OF AVIATION
PSYCHOLOGY
(AMRL-TR-65-161)
F AD-630 662 FLD. 5/10

•AF 33(657)-11737
PURDUE UNIV LAFAYETTE IND DEPT OF
STATISTICS
MIMEOGRAPH SERIES-66
AD-630 663 FLD. 12/1
MIMEOGRAPH SER-62
AD-630 837 FLD. 12/1

•AF 33(657)-12947
UED EARTH SCIENCES DIV TELEDYNE INC
ALEXANDRIA VA
SEISMIC DATA LAB-137
AD-631 052 FLD. 17/10

•AF 33(657)-12962
BATTELLE MEMORIAL INST COLUMBUS
OHIO
F AD-630 664 FLD. 1/4

•AF 33(657)-13172
CORNELL AERONAUTICAL LAB INC
BUFFALO N Y
CAL-VE-2027-D-3
AD-630 882 FLD. 14/5

•AF 33(657)-14120
MAGNAVOX CO FORT WAYNE IND
GOVERNMENT AND INDUSTRIAL DIV
AD-630 865 FLD. 14/4

•AF 33(657)-14997
MAGNAVOX CO FORT WAYNE IND
GOVERNMENT AND INDUSTRIAL DIV
AD-630 865 FLD. 14/4

•AF 33(657)-15053
LOCKHEED-GEORGIA CO MARIETTA
LG1S30-1-1
AD-631 186 FLD. 1/3

•AF 33(657)-15919
TELEDYNE INDUSTRIES INC ALEXANDRIA
VA EARTH SCIENCES DIV
SEISMIC DATA LAB-142
AD-630 699 FLD. 8/7
SEISMIC DATA- LAB-138
AD-631 043 FLD. 17/10
SDL-140
AD-631 109 FLD. 17/1

•AF 40(600)-1200
ARNOLD ENGINEERING DEVELOPMENT
CENTER ARNOLD AIR FORCE STATION
TENN
AEDC-TR-66-13
AD-630 922 FLD. 20/4
AEDC-TR-66-44
AD-630 630 FLD. 20/4
AEDC-TR-65-271
AD-630 899 FLD. 20/3
AEDC-TR-66-21
AD-630 901 FLD. 22/2
AEDC-TR-66-16
AD-631 149 FLD. 20/4

•AF 41(609)-2389
GARRETT CORP LOS ANGELES CALIF
AIRESEARCH MFG DIV
(SAM-TR-66-44)
AD-631 151 FLD. 6/19

•AF 41(609)-2635
RUTGERS - THE STATE UNIV NEW
BRUNSWICK N J DEPT OF PHYSIOLOGY
AND BIOCHEMISTRY
(SAM-TR-66-17)
AD-631 139 FLD. 6/16

•AF 49(638)-63
ILLINOIS UNIV URBANA ELECTRICAL
ENGINEERING RESEARCH LAB
TN-14
(AFOSR-TN-60-613)
AD-630 995 FLD. 12/1

•AF 49(638)-700
RAND CORP SANTA MONICA CALIF
RM-4986-PR
AD-630 985 FLD. 5/7

•AF 49(638)-869
ALLISON DIV GENERAL MOTORS CORP
INDIANAPOLIS IND
EDR-2277
(AFOSR-1969)
AD-630 703 FLD. 20/9

•AF 49(638)-947
RIAS INC BALTIMORE MD
(AFOSR-66-0602)
F AD-630 929 FLD. 6/1

•AF 49(638)-1029
WESTINGHOUSE RESEARCH LABS
PITTSBURGH PA
SP-62-925-116-P5
(AFOSR-2649)
AD-630 996 FLD. 20/12

•AF 49(638)-1121
IIT RESEARCH INST CHICAGO ILL
TECHNOLOGY CENTER
IITRI-C212-10
(AFOSR-66-0618)
AD-630 950 FLD. 20/13

•AF 49(638)-1194
UNIVAC BLUE BELL PA
(AFOSR-66-0628)
F AD-630 797 FLD. 9/2

*AF 99(638)-1271
PRINCETON UNIV N J GAS DYNAMICS LAB
691
(AFOSR-65-0098)
AD-631 177 FLD. 20/4

*AF 99(638)-1319
MASSACHUSETTS INST OF TECH CAMBRIDGE
(AFOSR-66-0196)
AD-630 794 FLD. 20/1

*AF 99(638)-1360
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
PIBAL-915
(AFOSR-66-0610)
F AD-630 923 FLD. 20/11

*AF 99(638)-1389
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
HEPL-430
AD-631 176 FLD. 20/8

*AF 99(638)-1391
POLYTECHNIC INST OF BROOKLYN N Y DEPT OF AEROSPACE ENGINEERING AND APPLIED MECHANICS
PIBAL-898
AD-630 557 FLD. 20/4

*AF 99(638)-1411
SPACE AND INFORMATION SYSTEMS DIV NORTH AMERICAN AVIATION INC DOWNEY CALIF
SID-65-1021-1-VOL-1
F AD-630 939 FLD. 5/4
SID-65-1021-2-VOL-2
F AD-630 940 FLD. 5/4

*AF 99(638)-1510
BUREAU OF SOCIAL SCIENCE RESEARCH INC WASHINGTON D C
(AFOSR-66-0124)
AD-630 793 FLD. 5/10
(AFOSR-66-0122)
AD-631 019 FLD. 5/11
(AFOSR-66-0123)
AD-631 020 FLD. 5/11
(AFOSR-66-0121)
AD-631 049 FLD. 5/11

*AF 99(638)-1551
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS
E-920333-2
(AFOSR-66-0633)
F AD-631 005 FLD. 20/9

*AF 99(638)-1577
AERONUTRONIC DIV PHILCO CORP NEWPORT BEACH CALIF
QLR-66-2
(AFOSR-66-0394)
AD-630 624 FLD. 21/2

*AF 99(638)-1601
MASSACHUSETTS INST OF TECH CAMBRIDGE FLUID DYNAMICS RESEARCH LAB
66-1
(AFOSR-66-0295)
AD-631 007 FLD. 20/13

*AF 99(638)-1700
RAND CORP SANTA MONICA CALIF
RM-4993-PR
AD-630 914 FLD. 11/2
RM-4969-PR
AD-630 944 FLD. 12/1
RM-4934-1-PR
AD-630 997 FLD. 7/4
RM-4958-PR
AD-631 013 FLD. 20/6

*AF 61(052)-392
UPPSALA UNIV (SWEDEN) INST OF PHYSICAL CHEMISTRY
(AFML-TR-65-276)
AD-630 669 FLD. 7/4

*AF 61(052)-447
FULMER RESEARCH INST LTD STOKE POGES (ENGLAND)
SCIENTIFIC-1
AD-630 633 FLD. 7/4

*AF 61(052)-451
CHALMERS UNIV OF TECHNOLOGY GOTEBORG (SWEDEN) RESEARCH LAB OF ELECTRONICS
US-44
(AFCRL-66-128)
F AD-631 047 FLD. 20/14

*AF 61(052)-490
INNSBRUCK UNIV (AUSTRIA)
(AFCRL-66-211)
F AD-631 046 FLD. 20/14

*AF 61(052)-675
INNSBRUCK UNIV (AUSTRIA) INST FOR THEORETICAL PHYSICS
SCIENTIFIC-28
(AFOSR-66-0348)
AD-630 632 FLD. 20/9

*AF 61(052)-751
HULL UNIV (ENGLAND) DEPT OF APPLIED PHYSICS
AD-631 045 FLD. 3/1

*AF 61(052)-759
SOREQ RESEARCH ESTABLISHMENT ISRAEL ATOMIC ENERGY COMMISSION YAVNEH
(AFCRL-66-213)
AD-631 044 FLD. 20/12

*AF 61(052)-762
RUBBER RESEARCH INST TNO DELFT (NETHERLANDS)
(AFML-TR-65-230)
F AD-630 907 FLD. 11/10

*AF 61(052)-772
AIX-MARSEILLE UNIV (FRANCE) INSTITUT DE MECANIQUE STATISTIQUE DE LA TURBULENCE
(AFOSR-66-0614)
AD-630 629 FLD. 20/4

*AF 61(052)-835
FORSVARETS FORSKNINGSINSTITUTT KJELLER (NORWAY)
INTERIM REPT. E-64
(AFCRL-66-11)
AD-631 042 FLD. 20/14

*AF 61(052)-896
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF PHYSICS
(AFOSR-66-0634)
AD-631 006 FLD. 20/4

*AF-AFOSR-1-63
POLYTECHNIC INST OF BROOKLYN FARMINGDALE N Y
(AFOSR-66-0622)
AD-631 128 FLD. 22/3

*AF-AFOSR-30-63
COLORADO UNIV BOULDER DEPT OF PHYSICS
(AFOSR-66-0459)
AD-630 983 FLD. 20/8

*AF-AFOSR-42-64
INSTITUTE FOR ADVANCED STUDY PRINCETON N J
(AFOSR-66-0452)
AD-630 586 FLD. 20/10
(AFOSR-66-0480)
AD-631 161 FLD. 20/10

*AF-AFOSR-92-63
PENNSYLVANIA STATE UNIV UNIVERSITY PARK ORDNANCE RESEARCH LAB
TM-603.2811-08
AD-630 798 FLD. 20/11

*AF-AFOSR-62-21
MCMASTER UNIV HAMILTON (ONTARIO) DEPT OF CHEMISTRY
(AFOSR-66-0629)
F AD-630 795 FLD. 7/2

*AF-AFOSR-62-97
MISSOURI UNIV COLUMBIA
(AFOSR-66-0298)
AD-631 113 FLD. 12/1

*AF-AFOSR-62-233
BROOKHAVEN NATIONAL LAB UPTON N Y
(AFOSR-66-0099)
AD-631 132 FLD. 12/1
RICE UNIV HOUSTON TEX DEPT OF MATHEMATICS
(AFOSR-66-0048)
AD-630 897 FLD. 12/1

*AF-AFOSR-62-303
LAMONT GEOLOGICAL OBSERVATORY PALISADES N Y
AD-631 134 FLD. 8/11

*AF-AFOSR-62-334
BRAZIL UNIV RIO DE JANEIRO INSTITUTO DE MATEMATICA PURA E APLICADA
(AFOSR-66-0031)
AD-631 133 FLD. 12/1

*AF-AFOSR-62-409
POLYTECHNIC INST OF BROOKLYN FREEPORT N Y
839
(AFOSR-66-0629)
AD-631 129 FLD. 7/4

*AF-AFOSR-64-65
MANCHESTER UNIV (ENGLAND) DEPT OF MECHANICS OF FLUIDS
(AFOSR-66-0101)
AD-631 162 FLD. 3/2

*AF-AFOSR-100-64
NORTHWESTERN UNIV EVANSTON ILL
(AFOSR-66-0119)
AD-631 160 FLD. 20/11

*AF-AFOSR-129-64
CALIFORNIA UNIV BERKELEY
(AFOSR-66-0349)
AD-631 159 FLD. 21/2

*AF-AFOSR-156-63
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF AERONAUTICS AND ASTRONAUTICS
(AFOSR-66-0330)
AD-631 138 FLD. 20/4
(AFOSR-66-0329)
AD-631 136 FLD. 20/4

*AF-AFOSR-156-64
MASSACHUSETTS INST OF TECH CAMBRIDGE
(AFOSR-66-0328)
AD-631 156 FLD. 20/4
(AFOSR-66-0623)
AD-631 157 FLD. 20/4

*AF-AFOSR-203-65
OHIO STATE UNIV COLUMBUS ROCKET RESEARCH LAB
(AFOSR-66-0342)
AD-630 641 FLD. 21/4

*AF-AFOSR-299-64
PITTSBURGH UNIV PA DEPT OF SOCIOLOGY
(AFOSR-66-0128)
AD-630 969 FLD. 5/4

*AF-AFOSR-310-63
SAO PAULO UNIV (BRAZIL) LABORATORIO DO ACELERADOR ELETROSTATICO
(AFOSR-66-0443)
AD-630 920 FLD. 20/8

*AF-AFOSR-236-63
CALIFORNIA UNIV BERKELEY
(AFOSR-66-0034)
AD-631 125 FLD. 12/1
(AFOSR-66-0035)
AD-631 127 FLD. 12/1
CALIFORNIA UNIV BERKELEY DEPT OF MATHEMATICS
(AFOSR-66-0008)
AD-630 898 FLD. 12/1
(AFOSR-66-0032)
AD-631 126 FLD. 12/1

*AF-AFOSR-237-63
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS
(AFOSR-66-0197)
AD-631 118 FLD. 9/5
(AFOSR-66-0199)
AD-631 123 FLD. 9/5
(AFOSR-66-0192)
AD-631 124 FLD. 12/1

*AF-AFOSR-272-63
MINNESOTA UNIV MINNEAPOLIS
(AFOSR-66-0247)
AD-630 984 FLD. 12/1
(AFOSR-66-0283)
AD-630 896 FLD. 12/1

*AF-AFOSR-400-64
MARYLAND UNIV COLLEGE PARK DEPT OF MATHEMATICS
(AFOSR-65-2113)
AD-630 985 FLD. 12/1

*AF-AFOSR-407-63
YALE UNIV NEW HAVEN CONN DEPT OF MATHEMATICS
(AFOSR-66-0015)
AD-631 114 FLD. 12/1

*AF-AFOSR-492-64
MASSACHUSETTS INST OF TECH CAMBRIDGE
(AFOSR-66-0243)
AD-631 185 FLD. 8/3

*AF-AFOSR-516-64
MCMASTER UNIV HAMILTON (ONTARIO) DEPT OF CHEMISTRY
(AFOSR-66-0629)
F AD-630 795 FLD. 7/2

*AF-AFOSR-553-64
CALIFORNIA UNIV BERKELEY
(AFOSR-66-0255)
AD-631 158 FLD. 12/1

*AF-AFOSR-641-64
MASSACHUSETTS INST OF TECH CAMBRIDGE AEROPHYSICS LAB
(AFOSR-66-0870)
AD-631 154 FLD. 7/4

*AF-AFOSR-649-64
MICHIGAN UNIV ANN ARBOR
(AFOSR-65-1963)
F AD-630 989 FLD. 20/4

*AF-AFOSR-716-65
COMISION NACIONAL DE INVESTIGACIONES ESPACIALES BUENOS AIRES (ARGENTINA)
CNIE-PE-7
(AFOSR-66-0631)
AD-630 805 FLD. 4/1

*AF-AFOSR-739-65
FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY
(AFOSR-66-0609)
F AD-630 678 FLD. 14/2

*AF-AFOSR-779-65
RESEARCH INST TEMPLE UNIV PHILADELPHIA PA
RITU-1965-40
(AFOSR-66-0607)
F AD-630 949 FLD. 7/2

*AF-AFOSR-1019-66
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
(AFOSR-66-0334)
AD-630 988 FLD. 20/4

*AF-AFOSR-1016-66
MARYLAND UNIV COLLEGE PARK INST FOR FLUID DYNAMICS AND APPLIED MATHEMATICS
BN-492
(AFOSR-66-0616)
AD-630 677 FLD. 20/9

*AF-EOAR-29-65
CAVENDISH LAB UNIV OF CAMBRIDGE (ENGLAND)
(AFOSR-66-0116)
AD-631 103 FLD. 19/4

*AF-EOAR-92-63
LOUVAIN UNIV (BELGIUM)
(AFOSR-66-0056)
AD-631 104 FLD. 21/2

*AF-EOAR-98-63
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF AERONAUTICAL ENGINEERING
SCIENTIFIC-2
(AFOSR-66-0569)
AD-630 943 FLD. 20/11
(AFOSR-66-0327)
AD-631 100 FLD. 20/11

*AF-EOAR-62-61
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF AERONAUTICAL ENGINEERING
(AFOSR-66-0327)
AD-631 100 FLD. 20/11

*AF-EOAR-71-64
TECHNION - ISRAEL INST OF TECH HAIFA
(AFOSR-66-0244)
AD-631 091 FLD. 12/1

*AF-EOAR-79-63
CAVENDISH LAB UNIV OF CAMBRIDGE (ENGLAND)
(AFOSR-66-0482)
AD-630 819 FLD. 20/8

*AF-EOAR-84-65
TECHNION - ISRAEL INST OF TECH HAIFA DEPT OF PHYSICS
(AFOSR-66-0347)
AD-631 098 FLD. 7/4

*AF-EOAR-98-63
POLITECNICO DI TORINO (ITALY) ISTITUTO DI MECCANICA APPLICATA
TN-39
(AFOSR-66-0339)
AD-630 799 FLD. 20/4
SCIENTIFIC-3
(AFOSR-66-0120)
AD-631 101 FLD. 20/4

*ARPA ORDER-31
AERONUTRONIC DIV PHILCO CORP NEWPORT BEACH CALIF
QLR-66-3
(AFOSR-66-0354)
AD-630 624 FLD. 21/2

*ARPA ORDER-306
AMERICAN OPTICAL CO SOUTHBRIDGE MASS RESEARCH DIV
RD-601-580
AD-630 933 FLD. 20/5
MASSACHUSETTS INST OF TECH CAMBRIDGE
BSR-4979
AD-631 039 FLD. 20/5

*ARPA ORDER-402-02
HERCULES RESEARCH CENTER WILMINGTON DEL
HRC-66-1
AD-630 945 FLD. 7/3

*ARPA ORDER-450
UTAH STATE UNIV LOGAN ELECTRO-DYNAMICS LABS
SCIENTIFIC-4
(AFCRL-66-109)
AD-630 990 FLD. 20/6

*ARPA ORDER-512
LINCOLN LAB MASS INST OF TECH LEXINGTON
(ESD-TDR-65-597)
AD-630 959 FLD. 17/10

*ARPA ORDER-596
MITRE CORP BEDFORD MASS
TM-4242
(ESD-TR-65-180)
AD-630 864 FLD. 20/3

*ARPA ORDER-629
TELEDYNE INDUSTRIES INC ALEXANDRIA VA EARTH SCIENCES DIV
SEISMIC DATA LAB-142
AD-630 699 FLD. 8/7
SEISMIC DATA- LAB-138
AD-631 043 FLD. 17/10
SDL-140
AD-631 105 FLD. 17/1
UED EARTH SCIENCES DIV TELEDYNE INC ALEXANDRIA VA
SEISMIC DATA LAB-137
AD-631 092 FLD. 17/10

*AT(49-5)-2110
NAVAL RESEARCH LAB WASHINGTON D C
NRL-MR-1676
AD-630 937 FLD. 8/10

*DA-04-200-AMC-796(X)
PHYSICS INTERNATIONAL CO SAN LEANDRO CALIF
PIFR-024
F AD-630 801 FLD. 14/2

*DA-11-022-ORD-2059
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
MRC-TSR-578
AD-630 925 FLD. 12/1
MRC-TSR-580
AD-630 926 FLD. 12/1
MRC-TSR-584
AD-630 927 FLD. 12/1
MRC-TSR-585
AD-630 928 FLD. 12/1
MRC-TSR-586
AD-630 929 FLD. 20/4
MRC-TSR-590
AD-630 930 FLD. 20/4
MRC-TSR-592
AD-630 931 FLD. 12/1
MRC-TSR-595
AD-630 932 FLD. 20/3
MRC-TSR-596
AD-630 933 FLD. 12/1
MRC-TSR-597
AD-630 934 FLD. 20/4
MRC-TSR-598
AD-630 935 FLD. 12/1
MRC-TSR-600
AD-630 936 FLD. 12/1
MRC-TSR-602
AD-630 937 FLD. 12/1
MRC-TSR-604
AD-630 938 FLD. 12/1
MRC-TSR-605
AD-630 939 FLD. 20/3
MRC-TSR-606
S AD-630 940 FLD. 20/10
MRC-TSR-608
AD-630 941 FLD. 12/1
MRC-TSR-609
AD-630 942 FLD. 20/10
MRC-TSR-610
AD-630 944 FLD. 20/4
MRC-TSR-611
AD-630 945 FLD. 12/1
MRC-TSR-612

AD-630 946 FLD. 12/1
MRC-TSR-613
AD-630 947 FLD. 12/1
MRC-TSR-614
AD-630 948 FLD. 12/1
MRC-TSR-615
AD-630 746 FLD. 12/1
MRC-TSR-617
AD-630 747 FLD. 12/1
MRC-TSR-618
AD-630 748 FLD. 20/10
MRC-TSR-619
AD-630 749 FLD. 12/1
MRC-TSR-620
AD-630 750 FLD. 14/2
MRC-TSR-621
AD-630 751 FLD. 12/1
MRC-TSR-623
AD-630 752 FLD. 12/1
MRC-TSR-624
AD-630 753 FLD. 12/1
MRC-TSR-628
AD-630 754 FLD. 6/3
MRC-TSR-635
AD-630 755 FLD. 12/1
MRC-TSR-637
AD-630 756 FLD. 12/1

•DA-11-190-ENG-78
MICHIGAN UNIV ANN ARBOR
(CRREL-RR-111-PT-2)
AD-630 603 FLD. 20/6

•DA-19-129-AMC-191(N)
LITTON SYSTEMS INC MINNEAPOLIS MINN APPLIED SCIENCE DIV
ASD-2905
F AD-630 889 FLD. 13/11

•DA-19-129-AMC-269(N)
AMERICAN CYANAMID CO BOUND BROOK N J
(ANL-66-9-CM)
AD-630 908 FLD. 11/3

•DA-22-079-ENG-225
NEWMARK HANSEN AND ASSOCIATES URBANA ILL
(AEWES-CR-1-139)
F AD-631 028 FLD. 18/3

•DA-28-043-AMC-00073(E)
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB
R-283
AD-630 625 FLD. 9/2

•DA-28-043-AMC-00150(E)
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
(ECOM-00150-F)
F AD-630 690 FLD. 9/1

•DA-28-043-AMC-00299(E)
BROWN UNIV PROVIDENCE R I
AD-630 863 FLD. 20/12

•DA-28-043-AMC-00373(E)
SPERRY ELECTRONIC TUBE DIV SPERRY RAND CORP GAINESVILLE FLA
SETD-NJ-2769-0202-5
F AD-630 700 FLD. 13/8

•DA-28-043-AMC-01292(E)
ELECTRO TECHNICAL ANALYSIS CORP TUCSON ARIZ
(ECOM-01292-2)
AD-630 962 FLD. 17/2.1

•DA-28-043-AMC-01303(E)
COLORADO STATE UNIV FORT COLLINS DEPT OF ATMOSPHERIC SCIENCE
AD-631 065 FLD. 4/2

•DA-28-043-AMC-01394(E)
ELECTRIC STORAGE BATTERY CO YARDLEY PA
(ECOM-01394-2)
AD-630 691 FLD. 10/3

•DA-28-043-AMC-01541(E)
HUGHES AIRCRAFT CO FULLERTON CALIF
FR-66-17-105
(ECOM-TR-01541-1)
AD-630 835 FLD. 9/1
FR-66-17-106
(ECOM-TR-01541-2)
AD-630 836 FLD. 9/1

•DA 28-043-AMC-01630(E)
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
T-16
(ECOM-01630-1)
AD-631 027 FLD. 9/1

•DA-28-043-AMC-01763(E)
EAGLE-PICHER CO JOPLIN MO COUPLES DEPT
AD-630 640 FLD. 10/3

•DA-30-069-ORD-3743
TITANIUM METALS CORP OF AMERICA NEW YORK
(WAL-TR-405/2-12)
AD-631 185 FLD. 11/6

•DA-31-124-ARO(D)-62
HERCULES RESEARCH CENTER WILMINGTON DEL
HRC-66-1
AD-630 948 FLD. 7/3

•DA-31-124-ARO(D)-139
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
(AROD-4995:29)
AD-630 719 FLD. 20/8

•DA-31-124-ARO(D)-219
CALIFORNIA UNIV LOS ANGELES DEPT OF PHYSICS
(AROD-2099:24)
AD-630 681 FLD. 20/12

•DA-31-124-ARO(D)-282
INSTITUTE OF OPTICS UNIV OF ROCHESTER N Y
(AROD-2049:10)
AD-630 713 FLD. 20/3

•DA-31-124-ARO(D)-287
CALIFORNIA UNIV SAN DIEGO LA JOLLA INST FOR RADIATION PHYSICS AND AERODYNAMICS
(AROD-5133:19)
AD-630 723 FLD. 20/8
AD-631 070 FLD. 20/4

•DA-31-124-ARO(D)-282
TEXAS A AND M UNIV COLLEGE STATION INST OF STATISTICS
TR-2
(AROD-4721:3)
AD-630 841 FLD. 12/2

•DA-31-124-ARO(D)-331
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
ORC-66-3
(AROD-5307:8)
AD-630 619 FLD. 12/2
ORC-66-4
AD-630 620 FLD. 12/2
ORC-65-33
(AROD-5307:7)
AD-630 861 FLD. 12/2

•DA-31-124-ARO(D)-385
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB
(AROD-5537:1)
AD-630 680 FLD. 9/1

•DA-31-124-ARO(D)-414
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J MATERIALS RESEARCH LAB
(AROD-5803:2)
AD-631 179 FLD. 20/2

•DA-36-039-AMC-01457
NATIONAL CO INC MELROSE MASS
AD-630 965 FLD. 9/1

•DA-36-039-AMC-01461(E)
INTERNATIONAL RESISTANCE CO PHILADELPHIA PA DOCUMENTED RELIABILITY DIV
F AD-630 935 FLD. 9/1

•DA-36-039-AMC-01475(E)
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV
AD-631 064 FLD. 9/1

•DA-36-039-AMC-02168(E)
RENSSELAER POLYTECHNIC INST TROY N Y
F AD-630 701 FLD. 20/12

•DA-36-039-AMC-02299(E)
GEORGIA INST OF TECH ATLANTA ENGINEERING EXPERIMENT STATION
31
(ECOM-02299-10)
AD-630 895 FLD. 20/14

•DA-36-039-AMC-02329(E)
TEXAS INSTRUMENTS INC' DALLAS SEMICONDUCTOR-COMPONENTS DIV
03-66-10
(ECOM-02329-8)
AD-631 034 FLD. 9/1

•DA-36-039-AMC-03270(E)
MICTRON INC ALBANY N Y
F AD-630 990 FLD. 9/1

•DA-36-039-AMC-03623(E)
MALLORY (P R) AND CO INC INDIANAPOLIS IND
AD-630 694 FLD. 9/1

•DA-36-039-AMC-03639(E)
MIDLAND-WRIGHT KANSAS CITY KANS
AD-630 710 FLD. 9/1

•DA-36-039-AMC-03742(E)
HAMILTON STANDARD DIV UNITED AIRCRAFT CORP BROAD BROOK CONN
HSER-3117
AD-630 948 FLD. 9/1

•DA-36-039-AMC-06162(E)
BOMAC DIV VARIAN ASSOCIATES BEVERLY MASS
AD-631 122 FLD. 9/1

•DA-36-039-AMC-06167(E)
MCCOY ELECTRONICS CO MOUNT HOLLY SPRINGS PA
AD-630 800 FLD. 9/1

•DA-36-039-SC-89976
CTS CORP ELKHART IND RESEARCH AND DEVELOPMENT DIV
AD-631 050 FLD. 14/2

•DA-36-039-SC-86737
LEWIS (E B) CO INC EAST HARTFORD CONN
AD-631 021 FLD. 9/1

•DA-36-039-SC-86742(E)
TRW SEMICONDUCTORS INC LAWNDALE CALIF
F AD-630 784 FLD. 9/1

•DA-36-039-SC-87197
STANFORD RESEARCH INST MENLO PARK CALIF
(DASA-1700)
F AD-631 170 FLD. 20/14

•DA-99-009-AMC-502(X)
CORNELL UNIV ITHACA N Y DEPT OF SURVEYING
F AD-631 072 FLD. 8/2

•DA-99-009-AMC-629(T)
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL

ENGINEERING
F AD-631 038 FLD. 10/1

•DA-99-009-AMC-1963(T)
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C
(AERDL-T-1829-66)
AD-630 687 FLD. 17/2
(AERDL-T-1823-66)
AD-630 688 FLD. 13/8
(AERDL-T-1824-66)
AD-631 171 FLD. 11/6
(AERDL-T-1834-66)
AD-631 172 FLD. 21/5
(AERDL-T-1836-66)
AD-631 173 FLD. 11/6
(AERDL-T-1837-66)
AD-631 174 FLD. 13/8

•DA-99-177-AMC-89(T)
SIKORSKY AIRCRAFT DIV UNITED AIRCRAFT CORP STRATFORD CONN
SER-50911
(USAAVLABS-TR-66-9)
AD-630 926 FLD. 20/11

•DA-99-177-AMC-101(T)
BOEING CO HORTON PA VERTOL DIV
R-929A
(USAAVLABS-TR-66-8)
F AD-630 925 FLD. 1/3

•DA-99-177-AMC-162(T)
BELL HELICOPTER CO FORT WORTH TEX
BHC-533-099-025
(USAAVLABS-TR-66-17)
F AD-630 927 FLD. 1/2

•DA-99-177-AMC-271(T)
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y
(USAAVLABS-TR-65-73)
F AD-630 929 FLD. 1/1

•DA-99-083-OSA-1183
ASTRO-ELECTRONICS DIV RADIO CORP OF AMERICA PRINCETON N J
SR-60-1
AD-630 761 FLD. 9/2

•DA-99-092-ARO-7
SPECIAL OPERATIONS RESEARCH OFFICE WASHINGTON D C COUNTERINSURGENCY INFORMATION ANALYSIS CENTER
AD-630 774 FLD. 15/7

•DA-99-146-XZ-290
EDGERTON GERMESHAUSEN AND GRIER INC SANTA BARBARA CALIF
S-283-R
(DASA-1704)
AD-630 866 FLD. 18/9

•DA-99-193-MD-2060
ILLINOIS UNIV URBANA GROUP EFFECTIVENESS RESEARCH LAB
TR-22
AD-630 796 FLD. 9/1

•DA-99-193-MD-2668
GEORGETOWN UNIV WASHINGTON D C
DEPT OF BIOLOGY
AD-630 707 FLD. 6/3

•DA-ARO-99-092-69-G92
UNIVERSIDAD DE LA REPUBLICA MONTEVIDEO (URUGUAY) INSTITUTO DE NEUROLOGIA
AD-630 938 FLD. 6/16

•DA-ARO(D)-31-124-G72
ILLINOIS UNIV URBANA DEPT OF CHEMISTRY AND CHEMICAL ENGINEERING
(AROD-3060:7)
AD-630 718 FLD. 7/2

•DA-ARO(D)-31-124-G141
CINCINNATI UNIV OHIO DEPT OF CHEMISTRY
(AROD-3118:9)
AD-630 721 FLD. 7/2

•DA-ARO(D)-31-124-G171
BOSTON UNIV MASS DEPT OF CHEMISTRY
(AROD-3193:1)
AD-631 107 FLD. 7/3

•DA-ARO(D)-31-124-G196
PENNSYLVANIA STATE UNIV UNIVERSITY PARK
AD-630 722 FLD. 20/4

•DA-ARO(D)-31-124-G337
STANFORD UNIV CALIF DEPT OF PHYSICS
(AROD-3269:28)
AD-631 108 FLD. 20/10

•DA-ARO(D)-31-124-G371
NEW YORK UNIV N Y
(AROD-3133:9)
AD-630 716 FLD. 12/2

•DA-ARO(D)-31-124-G909
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY
(AROD-1112:24)
AD-630 720 FLD. 7/3

•DA-ARO(D)-31-124-G916
FLORIDA UNIV GAINESVILLE
(AROD-4050:8)
F AD-630 840 FLD. 7/3
FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY
(AROD-4050:7)
AD-631 109 FLD. 7/3
(AROD-4050:6)
AD-631 112 FLD. 7/3

•DA-ARO(D)-31-124-G965
SAN DIEGO STATE COLL CALIF DEPT OF CHEMISTRY
(AROD-4192:3)
AD-630 719 FLD. 7/4

•DA-ARO(D)-31-124-G966
INSTITUTE FOR MOLECULAR PHYSICS UNIV OF MARYLAND COLLEGE PARK
(AROD-4251:7)
AD-630 717 FLD. 7/4

•DA-ARO(D)-31-124-G876
CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING
(AROD-3177:4)
AD-630 679 FLD. 9/5

•DA-ARO(D)-31-124-G618
UTAH UNIV SALT LAKE CITY INST FOR THE STUDY OF RATE PROCESSES
(AROD-2759:9)
AD-631 110 FLD. 7/4

•DA-ARO(D)-31-124-G678
CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING
(AROD-3718:1)
AD-630 719 FLD. 20/12

•DA-ARO(D)-31-124-G738
MINNESOTA UNIV MINNEAPOLIS DEPT OF CHEMISTRY
(AROD-2297:9)
AD-631 111 FLD. 7/5

•DA-ENG-27-021-62-G2
MIAMI UNIV CORAL GABLES FLA SCHOOL OF ENGINEERING
(CRREL-RR-139)
AD-630 902 FLD. 19/2

•DRB-8869-09
TORONTO UNIV (ONTARIO) DEPT OF PHYSIOLOGY
AD-630 977 FLD. 6/16

•DRB-9310-79
LAVAL UNIV QUEBEC DEPT OF PHYSIOLOGY
AD-630 979 FLD. 6/19

•DRB-9310-84
ROYAL VICTORIA HOSPITAL MONTREAL (QUEBEC)
AD-630 979 FLD. 6/19

•DRB-9310-92
MCGILL UNIV MONTREAL (QUEBEC) AVIATION MEDICAL RESEARCH UNIT
AD-630 978 FLD. 6/19

•DRB-9350-19
TORONTO UNIV (ONTARIO) DEPT OF MEDICAL BIOPHYSICS
AD-630 994 FLD. 6/16

•HA-1920
TORONTO UNIV (ONTARIO) DEPT OF MEDICAL BIOPHYSICS
AD-630 994 FLD. 6/16

•N9ENR-938(03)
IOWA STATE UNIV IOWA CITY
AD-631 011 FLD. 4/1

•N123(953)53308A
MONTANA STATE UNIV BOZEMAN ELECTRONICS RESEARCH LAB
F AD-630 967 FLD. 17/2

•N123(62738)39257A(X)
ITT INDUSTRIAL LABS FORT WAYNE IND
S-3312
F AD-630 711 FLD. 17/2

•N600(61833)62758
MINNESOTA MINING AND MFG CO ST PAUL THERMOELECTRIC PRODUCTS
AD-631 037 FLD. 10/2

•N62558-3586
HEBREW UNIV JERUSALEM (ISRAEL) DEPT OF MATHEMATICS
AD-631 081 FLD. 12/1

•NASA ORDER-R-93
NAVAL AEROSPACE MEDICAL INST PENSACOLA FLA
AD-630 946 FLD. 6/19
AD-630 947 FLD. 6/19

•NBS-CST-1196
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
(AROD-4445:29)
AD-630 714 FLD. 20/8

•NGR-50-022-028
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
MRC-TSR-602
AD-630 937 FLD. 12/1

•NIH-M-5396
DUKE UNIV DURHAM N C
TR-20
AD-630 951 FLD. 9/10

•NO2-69-0316-F
AVCO CORP WILMINGTON MASS SPACE SYSTEMS DIV
S AD-630 776 FLD. 11/2

•NOAS-60-6108C
BRUSH BERYLLIUM CO CLEVELAND OHIO
TR-200-228
F AD-630 859 FLD. 13/8

•NOBSR-89398
ITT FEDERAL LABS NUTLEY N J
TD-69-387
F AD-630 623 FLD. 17/2

•NOBSR-89503
S F D LABS INC UNION N J
SFD-33-1DR-9
AD-630 997 FLD. 9/5

•NONR-222(59)
CALIFORNIA UNIV SAN FRANCISCO

MEDICAL CENTER
AD-630 969 FLD. 6/15
AD-630 970 FLD. 6/15

•NONR-222(69)
CALIFORNIA UNIV BERKELEY DIV OF APPLIED MECHANICS
AM-66-2
AD-630 772 FLD. 20/4
AM-66-3
AD-630 773 FLD. 20/11

•NONR-222(83)
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
ORC-66-2
(AROD-9307:8)
AD-630 619 FLD. 12/2
ORC-66-4
AD-630 620 FLD. 12/2

•NONR-222(88)
CALIFORNIA UNIV BERKELEY DEPT OF MATHEMATICS
AD-630 968 FLD. 12/2

•NONR-225(37)
STANFORD UNIV CALIF DEPT OF COMPUTER SCIENCE
CS-34
AD-630 998 FLD. 12/1

•NONR-225(50)
STANFORD UNIV CALIF INST FOR MATHEMATICAL STUDIES IN THE SOCIAL SCIENCES
TR-141
AD-630 627 FLD. 9/3
TR-142
AD-630 666 FLD. 9/3

•NONR-225(67)
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
HEPL-423
AD-630 624 FLD. 20/8
HEPL-901
AD-631 175 FLD. 18/9
HEPL-430
AD-631 176 FLD. 20/8
HEPL-429
AD-631 184 FLD. 20/8

•NONR-285(59)
COURANT INST OF MATHEMATICAL SCIENCES NEW YORK UNIV N Y
IMM-347
AD-631 121 FLD. 20/4

•NONR-562(20)
BROWN UNIV PROVIDENCE R I DIV OF ENGINEERING
TR-97
AD-630 922 FLD. 20/11
TR-98
AD-630 923 FLD. 11/6

•NONR-609(47)
YALE UNIV NEW HAVEN CONN DEPT OF ENGINEERING AND APPLIED SCIENCE
AD-630 910 FLD. 20/4

•NONR-656(23)
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF PHYSICS
TR-8
AD-630 572 FLD. 11/6

•NONR-656(29)
PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF FUEL SCIENCE
FS66-1
AD-630 912 FLD. 21/9.2

•NONR-710(24)
SAINT ANTHONY FALLS HYDRAULIC LAB UNIV OF MINNESOTA MINNEAPOLIS
F AD-630 709 FLD. 20/4

•NONR-710(58)
MINNESOTA UNIV MINNEAPOLIS SCHOOL OF PHYSICS
AD-630 971 FLD. 18/2

•NONR-760(24)
CARNEGIE INST OF TECH PITTSBURGH PA GRADUATE SCHOOL OF INDUSTRIAL ADMINISTRATION
AD-631 079 FLD. 5/1

•NONR-761(09)
GEORGE WASHINGTON UNIV WASHINGTON D C SCHOOL OF ENGINEERING AND APPLIED SCIENCE
5
AD-631 095 FLD. 9/5

•NONR-1100(19)
PURDUE UNIV LAFAYETTE IND OCCUPATIONAL RESEARCH CENTER
AD-630 911 FLD. 5/9

•NONR-1141(11)
CASE INST OF TECH CLEVELAND OHIO OPERATIONS RESEARCH GROUP
TM-14
AD-630 942 FLD. 12/2
TM-16
AD-630 943 FLD. 12/2

•NONR-1141(12)
CASE INST OF TECH CLEVELAND OHIO OPERATIONS RESEARCH GROUP
TM-14
AD-630 942 FLD. 12/2
TM-16
AD-630 943 FLD. 12/2

•NONR-1141(17)
CASE INST OF TECH CLEVELAND OHIO OPERATIONS RESEARCH GROUP
TM-17
AD-631 120 FLD. 5/3

•NONR-1181(11)
DUKE UNIV DURHAM N C
TR-20
AD-630 951 FLD. 5/10

•NONR-1202(25)
WISCONSIN UNIV MADISON GEOPHYSICAL AND POLAR RESEARCH CENTER
RR-66-1
F AD-630 783 FLD. 8/14

•NONR-1229(39)
MICHIGAN UNIV ANN ARBOR DEPT OF PHYSICS
AD-630 886 FLD. 20/8

•NONR-1677(01)
BRANDEIS UNIV WALTHAM MASS DEPT OF CHEMISTRY
TR-16
AD-630 917 FLD. 7/4

•NONR-1841(12)
MASSACHUSETTS INST OF TECH CAMBRIDGE HYDRODYNAMICS LAB
TR-44
AD-630 775 FLD. 20/4

•NONR-1841(68)
MASSACHUSETTS INST OF TECH CAMBRIDGE HYDRODYNAMICS LAB
TR-44
AD-630 775 FLD. 20/4

•NONR-1866(07)
PICKARD AND BURNS ELECTRONICS WALTHAM MASS
P/B PUB. NO. 886B
(AD-603 764 SUPERSEDED)
AD-630 900 FLD. 17/7

•NONR-1866(24)
HARVARD UNIV CAMBRIDGE MASS ACOUSTICS RESEARCH LAB
TM-50
AD-631 016 FLD. 20/1

•NONR-1866(49)
CLAPP (WILLIAM F) LABS INC DUXBURY MASS
AD-630 696 FLD. 1

•NONR-1866(50)
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS
TR-5
AD-630 973 FLD. 20/2

•NONR-2216(19)
SCRIPPS INSTITUTION OF OCEANOGRAPHY SAN DIEGO CALIF VISIBILITY LAB
AD-631 033 FLD. 20/6

•NONR-2249(09)
CATHOLIC UNIV OF AMERICA WASHINGTON D C
AD-630 708 FLD. 6/3

•NONR-2300(12)
NATIONAL ACADEMY OF SCIENCES-NATIONAL RESEARCH COUNCIL WASHINGTON D C PACIFIC SCIENCE BOARD
AD-630 789 FLD. 8/6

•NONR-2318(00)
CLAPP (WILLIAM F) LABS INC DUXBURY MASS
AD-630 696 FLD. 1

•NONR-2332(00)
NAVAL WARFARE RESEARCH CENTER STANFORD RESEARCH INST MENLO PARK CALIF
AD-631 080 FLD. 20/1

•NONR-2587(09)
MICHIGAN STATE UNIV EAST LANSING DEPT OF STATISTICS
MSU-RM-149
AD-631 057 FLD. 12/2

•NONR-2771(09)
OREGON UNIV EUGENE DEPT OF PHYSICS
TR-8
AD-630 621 FLD. 20/10

•NONR-3718(01)
NEBRASKA UNIV LINCOLN
AD-631 187 FLD. 20/12

•NONR-3963(02)
RESEARCH LAB OF ELECTRONICS MASS INST OF TECH CAMBRIDGE
F AD-630 628 FLD. 3/2

•NONR-3963(03)
MASSACHUSETTS INST OF TECH CAMBRIDGE FLUID DYNAMICS RESEARCH LAB
66-1
(AFOSR-66-0293)
AD-631 007 FLD. 20/13

•NONR-3963(22)
MASSACHUSETTS INST OF TECH CAMBRIDGE
BSR-4979
AD-631 039 FLD. 20/5

•NONR-4010(09)
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF STATISTICS
TR-48
AD-630 606 FLD. 12/1
TR-51
AD-630 887 FLD. 12/1
TR-32
AD-630 888 FLD. 12/1
TR-47
AD-631 036 FLD. 6/1

•NONR-4099(00)
GEOSCIENCE LTD LA JOLLA CALIF
GLR-47
AD-630 712 FLD. 6/16

•NONR-4109(00)
PICKARD AND BURNS ELECTRONICS WALTHAM MASS
P/B PUB. NO. 8868
(AD-603 764 SUPERSEDED)
AD-630 900 FLD. 17/7

•NONR-4715(00)(X)
DOUGLAS AIRCRAFT CO INC SANTA MONICA CALIF MISSILE AND SPACE SYSTEMS DIV
SM-49372
F AD-630 660 FLD. 9/2

•NONR-4751(00)
HRB-SINGER INC STATE COLLEGE PA
PTB-66-2
F AD-631 023 FLD. 9/5

•NONR-4875(00)
AMERICAN OPTICAL CO SOUTHBRIDGE MASS RESEARCH DIV
RD-601-S80
AD-630 933 FLD. 20/5

•NONR(G)-00039-65
TEXAS TECHNOLOGICAL COLL LUBBOCK DEPT OF CHEMISTRY
F AD-630 806 FLD. 3/2

•NOW-62-0604-C
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
TG-230-T463
(TT-66-60937)
AD-630 824 FLD. 20/6
TG-230-T464
(TT-66-60938)
AD-630 825 FLD. 21/8
TG-610-13
AD-630 826 FLD. 21/5
TG-610-10
AD-630 827 FLD. 21/5
TG-610-8
AD-630 828 FLD. 21/5
TG-230-T469
(TT-66-60965)
AD-630 867 FLD. 20/4
TG-230-T470
(TT-66-60966)
AD-630 868 FLD. 20/4
TG-230-T462
(TT-66-60997)
AD-631 013 FLD. 20/10
TG-230-T471
(TT-66-60998)
AD-631 014 FLD. 8/3
TG-719
AD-631 024 FLD. 17/7
TG-230-T466
(TT-66-61005)
AD-631 025 FLD. 4/1

•NOW-65-0123-D
PENNSYLVANIA STATE UNIV UNIVERSITY PARK ORDNANCE RESEARCH LAB
TM-603.2811-05
AD-630 798 FLD. 20/11

•NSF-G-10726
JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF STATISTICS
TR-47
AD-631 036 FLD. 6/1

•NSF-G24863
WISCONSIN UNIV MADISON GEOPHYSICAL AND POLAR RESEARCH CENTER
CONTRIBUTION-112
AD-630 955 FLD. 8/7

•NSF-GP-700
ILLINOIS UNIV URBANA DEPT OF CHEMISTRY AND CHEMICAL ENGINEERING
(AROD-3060:7)
AD-630 718 FLD. 7/2

•NSF-GP-2280
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
MRC-TSR-580
AD-630 926 FLD. 12/1

•NSF-GP-2417
HIGH ENERGY PHYSICS LAB STANFORD UNIV CALIF
HEPL-429
AD-631 184 FLD. 20/8

•NSF-GP-2689
CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING
(AROD-9177:4)
AD-630 679 FLD. 9/5

•NSF-GP-3937
MARYLAND UNIV COLLEGE PARK DEPT OF MATHEMATICS
(AFOSR-69-2113)
AD-630 985 FLD. 12/1

•NSF-GS-570
MICHIGAN UNIV ANN ARBOR
AD-630 965 FLD. 9/10

•NSG-279-62
MATHEMATICS RESEARCH CENTER UNIV OF WISCONSIN MADISON
MRC-TSR-618
AD-630 748 FLD. 20/10

•NSG-398
INSTITUTE FOR MOLECULAR PHYSICS UNIV OF MARYLAND COLLEGE PARK
(AROD-9251:7)
AD-630 717 FLD. 7/4

•NSG-586
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MATHEMATICS
AD-630 960 FLD. 20/4

•OCD-OS-63-134
INSTITUTE FOR DEFENSE ANALYSES ARLINGTON VA ECONOMIC AND POLITICAL STUDIES DIV
STUDY-S-209
AD-631 026 FLD. 15/3

•OCD-PS-64-21
CARNEGIE INST OF TECH PITTSBURGH PA DEPT OF CIVIL ENGINEERING
F AD-630 843 FLD. 13/13

•PHS-DE-01577-02
NAVAL MEDICAL RESEARCH INST BETHESDA MD
AD-630 982 FLD. 6/5

•PHS-DE-01774
HASKINS LABS NEW YORK
AD-630 574 FLD. 17/2
AD-630 575 FLD. 9/7
AD-630 577 FLD. 6/12

•PHS-GM-9606
OPERATIONS RESEARCH CENTER UNIV OF CALIF BERKELEY
ORC-65-33
(AROD-5307:7)
AD-630 861 FLD. 12/2

•PHS-GM-09692
EMORY UNIV ATLANTA GA SCHOOL OF MEDICINE
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TR=51
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TR=100
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TR=141
AD-630 627 FLD. 5/3

TR=142
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AD-630 727 FLD. 6/10

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AD-630 728 FLD. 6/15

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AD-630 552 FLD. 9/2

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AD-630 553 FLD. 9/2

TT=66=60836
AD-630 554 FLD. 9/2

TT=66=60837
AD-630 555 FLD. 9/2

TT=66=60838
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TT=66=60901

AD-630 667 FLD. 9/2

TT-66-60902
AD-630 668 FLD. 9/2

TT-66-60903
AD-630 669 FLD. 12/1

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TT-66-60909
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AD-630 731 FLD. 6/9

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AD-630 735 FLD. 6/9

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AD-630 741 FLD. 8/3

TT-66-60932
AD-630 742 FLD. 21/5

TT-66-60933
AD-630 744 FLD. 11/1

TT-66-60934
AD-630 764 FLD. 21/1

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AD-630 802 FLD. 15/2

TT-66-60937
AD-630 824 FLD. 20/6

TT-66-60938
AD-630 825 FLD. 21/8

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TT-66-60950
AD-630 845 FLD. 6/13

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AD-630 846 FLD. 6/8

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AD-630 847 FLD. 11/9

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AD-630 848 FLD. 11/3

TT-66-60954
AD-630 849 FLD. 21/5

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AD-630 850 FLD. 14/2

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TT-66-60957
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AD-630 857 FLD. 6/13

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AD-630 868 FLD. 20/9

TT-66-60967
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TT-66-60971
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AD-630 971 FLD. 11/6

TT-66-60988
AD-630 972 FLD. 20/9

TT-66-60989
AD-630 973 FLD. 6/1

TT-66-60990
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AD-630 975 FLD. 14/2

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OTHER RESEARCH REPORTS AND RELATED MATERIAL

1. AERONAUTICS

AD-294 472 **Field 1A, 20C**
CFSTI Price: HC$1.00
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
PLASMA FREQUENCY AND ELECTRON COLLISION FREQUENCY CHARTS FOR HYPERSONIC VEHICLE EQUILIBRIUM FLOW FIELDS IN AIR.
Technical rept.,
by Henry M. Musal, Jr. Dec 62, 15p TR62-209C
Contract DA-04-495-ORD-3567 (Z), ARPA Order-347-62

Descriptors: (*Hypersonic flow, Plasma physics), (*Plasma medium, Hypersonic flow), (*Electrons, Hypersonic flow), Frequency, Density, Altitude, Velocity, Stagnation point, Wake, Blunt bodies, Air.

Identifiers: Particle interactions, Defender project.

The purpose of the report is to present charts of plasma frequency and electron collision frequency as functions of air density (altitude) and vehicle velocity for selected regions of equilibrium hypersonic flow fields, with a brief description of the method of derivation and the area of applicability. The two particular regions of the flow field treated here are the stagnation region and the end-point of the isentropic (expansion controlled) part of the wake of a blunt body. The charts cover the altitude range from zero to 350,000 feet and the velocity range from 6,000 to 40,000 feet/second. (Author)

AD-294 868 **Field 1A, 20C**
CFSTI Prices: HC$3.00
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
IONIZATION IN HYPERSONIC WAKES. REVIEW OF MICROWAVE PROBE INSTRUMENTATION AND SUMMARY OF PRELIMINARY DATA.
Technical rept.,
by R. I. Primich and R. A. Hayami. Dec 62, 69p TR62-209D
Contract DA-04-495-ORD-3567, ARPA Order-347-62

Descriptors: (*Plasma medium, Probes (Electromagnetic)), (*Wake, Gas ionization), (*Hypersonic flow, Plasma medium), (*Probes (Electromagnetic), Gas ionization), Instrumentation, Data, Electron density, Frequency, Reviews, Antennas, Microwaves.

An outline is given of the progress which has been made in the development of the focused microwave probe as a plasma diagnostics tool, and in the application of it to the study of ionization in hypersonic wakes. Since a major part of the development was concerned with instrumentation, the theoretical analysis of the interaction of the probe field with a plasma, data reduction, and interpretation of the results in terms of magnitudes and spatial variations of electron density and collision frequency, the report deals with these topics in detail. Numerous results were recorded and are undergoing data reduction. (Author)

AD-413 158 **Field 1A, 20C**
CFSTI Prices: HC$3.00
GM Defense Research Labs., Santa Barbara, Calif. Aerospace Operations Dept.
MILLIMETER WAVELENGTH FOCUSED PROBES AND FOCUSED, RESONANT PROBES FOR USE IN STUDYING IONIZED WAKES BEHIND HYPERSONIC VELOCITY PROJECTILES.
Technical rept.,
by R. I. Primich and R. A. Hayami. Jul 63, 57p TR63-217C
Contract DA-04-495-ORD-3567 (Z), ARPA Order-347-63

Descriptors: (*Plasma medium, Probes (Electro magnetic)), (*Wake, Gas ionization), (*Hypervelocity projectiles, Wake), (*Probes (Electromagnetic), Gas ionization), Controlled atmospheres, Design, Sensitivity, Antennas, Microwaves.

Strongly focused microwave beams are being used as a plasma diagnostics tool in the determination of the magnitude and spatial distribution of ionization behind projectiles fired at hypersonic velocities into the controlled atmosphere of a flight physics range. The importance of millimeter wavelength techniques for this purpose is stressed. The design philosophy of focused plasma probes is outlined and specific details of 35 and 70 Gc probes are given, together with some typical results. The conversion of such a probe into a free-space resonator in which the resolution is preserved, but in which the sensitivity is greatly improved, is discussed and some preliminary results are given. (Author)

AD-452 641 **Field 1B, 22A, 21H**
CFSTI Price: HC$3.00
North American Aviation, Inc., Los Angeles, Calif.
ESTIMATED PERFORMANCE REPORT FOR THE ADVANCED X-15A-2 AIRPLANE WITH ONE YLR-99-RM-1 ENGINE, NAA MODEL NO. NA-240-2.
Rept. for Apr-Jun 64,
by A. F. Tweedie. Jun 64, 71p NA-64-574
Contract AF33 (657)-6506

Descriptors: (*Aerospace craft, Performance (Engineer ing)), (*Rocket planes, Performance (Engineering)), Reentry vehicles, Configuration, Velocity, Rocket motors.

Identifiers: X-15 aircraft.

The pertinent exit and reentry performance of the Advanced X-15A-2 is presented. The estimated maximum velocity for the contractor responsible overweight configuration is 8280 ft./sec. while in the probable flight configuration a maximum velocity of 7850 ft./sec. can be achieved. (Author)

AD-453 850 **Field 1A**
CFSTI Price: HC$2.00
Ballistic Research Labs., Aberdeen Proving Ground, Md.
GROWTH OF THE TURBULENT INNER WAKE BEHIND LARGE SPHERES AT SUPERSONIC VELOCITIES,
by Walter F. Braun. Sep 64, 31p Memo. rept.
BRL-MR-1597
Proj. RDT/E-1M014501A33D
N65 15557

Descriptors: (*Turbulence, Wake), (*Spheres, Supersonic characteristics), Schlieren photography, Guided missiles.

Experimental data are presented on the growth of the envelope of the turbulent inner wakes up to 3000 calibers behind 9/16, 3/4 and 2-inch spheres traveling at supersonic velocities. A description of the experimental technique and a discussion of its limitations for obtaining adequate data are given. Data are fitted to the equation r cubed - bx sub e = 3 and the growth of the far wake is compared with theoretical predictions. Values of C sub D are computed using the coefficient b from this equation in the expression b = 1.85 KC sub D. Since there exists and aperiodic development of the wake envelope and since the small sample size of the data may bias the determination of the growth rate, the data from all available rounds were averaged to obtain values of C sub D. (Author)

AD-466 625 **Field 1A, 16B, 22C**
CFSTI Prices: HC$1.00 MF$0.50
Heliodyne Corp., Los Angeles, Calif.
SHOCK WAVE STRUCTURE IN A DUSTY ABLATING GAS,
by Ali Hasan Nayfeh. Jun 65, 19p Research note-23
Contract DA-04-495-AMC-458 (Z), ARPA Order-360

Descriptors: (*Shock waves, Equations), (*Ablation, Shock waves), (*Dust, Drag), Particles, Convection (Heat trar sfer), Radiation (Heat transfer), Pressure, Velocity, Temperature, Vaporization, Argon, Halocarbon plastics, Shock tubes, Atmospheric entry.

Identifiers: Defender project.

The general one-dimensional equations governing the flow of a mixture of a gas and an ablating dust in a constant-area tube are derived taking into account the simultaneous effects of the dust particle drag, convective and radiative heat transfer, and ablation. The pressure, velocity, and temperature in the equilibrium region, i.e., where the dust is completely vaporized, are obtained by neglecting the particle drag, convective and radiative heat transfer. The results show that the driving pressure ratio needed in a shock tube to attain a shock speed of 160,000 cm/sec in a mixture of argon and 10% mass fraction teflon at room temperature is about 50% more than that needed to attain the same shock speed in pure argon. The effect of the presence of the dust on increasing the driving pressure ratio is in qualitative agreement with observations in Heliodyne's shock tube. These results are encouraging so that the relaxation zone will be constructed in the near future by solving the above mentioned equations. (Author)

AD-466 633 **Field 1A, 14B, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Heliodyne Corp., Los Angeles, Calif.
A SUMMARY OF CALCULATIONS OF CHEMICAL AND FLUID DYNAMIC PARAMETERS IN THE SAPAG FACILITY,
by W. J. Hooker. Jun 65, 37p Research Note-17
Contract DA-04-495-AMC-458 (Z), ARPA Order-360

Descriptors: (*Particles, Ablation), (*Ablation, Particles), (*Shock waves, Ablation), Shock tubes, Atmospheric entry, Simulation, Superaerodynamics, Powders, Thermodynamics, Test facilities.

Identifiers: SAPAG Facility.

Calculations are presented for the trajectories and burnup times of submicron-size particles in a shock tube where the local flow is free molecular with respect to the particles. Materials ranging in thermodynamic properties from teflon to graphite are treated. It is shown that the burnup times are short compared to characteristic shock tube testing times, and that the small (0.2 micron diameter) particles accelerate to the local free stream velocity almost instantaneously. An operating map is presented for calculating the acceleration time of particles in a shock tube where the local flow is continuum with respect to the particles. (Author)

Patent 3,228,637 **Field 1C**
ROTA-VANE PARACHUTE.
Patent assigned to Air Force,
by Reinhold J. Gross. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Rotorchutes, Design), Patents, Drag, Stability, Flaps.

The parachute has a plurality of segmental gores or panels secured together along their radial edges

to form a flat circular canopy in which the outer end portions of the gores or panels are not connected together, and the shroud lines are connected to the ends of the panels at one side, and connected in inwardly spaced relation to the ends at the opposite side to provide inclined triangular air deflecting flaps at the outer ends of the panels. A flexible tie connector is provided to limit outward deflection of the inclined flaps by the air stream.

Patent 3,236,477 **Field 1C**
JET VEST.
Patent assigned to Army,
by Thomas M. Moore. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Jet propulsion, Military personnel), Patents, Personnel, Portable, Rocket motors, Thrust.

Identifiers: Jet vests.

The propulsion unit is for use by a foot soldier to provide greater mobility on the battlefield. The propulsion unit is mounted on the back of a soldier by a harness which fits around the user's body. The device includes a torso engaging portion which fixedly mounts the weightier components of the unit. The upper portion of the unit, including the propulsion nozzles, is attached to the user's shoulders.

Patent 3,236,480 **Field 1C**
EJECTION APPARATUS.
Patent assigned to Army,
by Albert M. Stott. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Ejection seats, Rocket propulsion), Rocket motors, Supersonic planes, Encapsulation.

An aircraft is provided with an ejectable encapsulated individual seat and a rocket structure for separating it from the aircraft. The rocket structure includes two coaxially aligned rocket tubes containing rocket propellant. A housing carries the nozzles. The rockets are fired by firing pins responsive to generated gas pressure.

PB-169 403 **Field 1B, 1E**
CFSTI Prices: HC$4.00 MF$0.75
Operations Research, Inc., Silver Spring, Md.
ECONOMIC FEASIBILITY OF ALTERNATIVE PROGRAMS FOR WASHINGTON NATIONAL AIRPORT. PART I.
26 Jan 66, 103p Technical rept. TR-353-Pt-1
Contract FA-65-WA-1326

Descriptors: (*Airports, District of Columbia), (*Civil aviation, Terminal flight facilities), (*Air traffic, Economics), Aeronautics, Urban areas, Virginia, Maryland, Commercial planes, Jet transport planes, Landings, Feasibility studies, Operations research, Transportation, Urban planning.

Identifiers: Washington National Airport.

The study forecasts the consequences of three alternative policies affecting air carrier operations at Washington National Airport (WNA): continued prohibition against jet operations, removal of restriction against short- and medium-range jet aircraft, and unrestricted use of WNA by all types of air carrier jets except those serving international markets. Physical activity and economic consequences of these alternatives are projected to 1980 for each of the three Washington area airports, including Dulles International and Friendship International. Estimates are given of total annual passenger traffic, total annual aircraft traffic, mix of aircraft types in air carrier operations, annual volume of general aviation traffic, cargo, and mail. The value of public benefits is derived from total trip time savings for air passengers resulting from the availability of jet services at WNA. Net revenues (profit or loss) accruing to the Government operators of the airports are estimated, and the noise environment surrounding WNA under the alternatives is mapped. (Author)

PB-169 407 **Field 1B, 1E**
CFSTI Prices: HC$5.00 MF$1.00
Operations Research, Inc., Silver Spring, Md.
ECONOMIC FEASIBILITY OF ALTERNATIVE PROGRAMS FOR WASHINGTON NATIONAL AIRPORT. PART II. APPENDICES.
26 Jan 66, 156p Technical rept. TR-353-Pt-2
Contract FA-65-WA-1326
See also PB-169 403.

Descriptors: (*Airports, District of Columbia), (*Civil aviation, Terminal flight facilities), (*Air traffic, Economics), Aeronautics, Urban areas, Virginia, Maryland, Commercial planes, Jet transport planes, Landings, Feasibility studies, Operations research, Transportation, Statistical data, Urban planning.

Identifiers: Washington National Airport.

The study forecasts the consequences of three alternative policies affecting air carrier operations at Washington National Airport (WNA): continued prohibition against jet operations, removal of restriction against short- and medium-range jet aircraft, and unrestricted use of WNA by all types of air carrier jets except those serving international markets. Physical activity and economic consequences of these alternatives are projected to 1980 for each of the three Washington area airports, including Dulles International and Friendship International. Estimates are given of total annual passenger traffic, total annual aircraft traffic, mix of aircraft types in air carrier operations, annual volume of general aviation traffic, cargo, and mail. The value of public benefits is derived from total trip time savings for air passengers resulting from the availability of jet services at WNA. Net revenues (profit or loss) accruing to the Government operators of the airports are estimated, and the noise environment surrounding WNA under the alternatives is mapped. (Author)

PB-169 521 **Field 1E, 1B**
CFSTI Prices: HC$8.00 MF$2.25
Massachusetts Inst. of Tech., Cambridge. Flight Transportation Lab.
A SYSTEMS ANALYSIS OF SHORT HAUL AIR TRANSPORTATION.
Aug 65, 499p Technical rept. TR-65-1
Contract C-85-65
Rept. on Proj. Transport, pt-3 Northeast Corridor Transportation.

Descriptors: (*Air transportation, State-of-the-art reviews), Aircraft, Ground support equipment, Cost effectiveness, Value engineering, Maintenance, Management engineering, Systems engineering, Operations research, Civil aviation, Traffic, Volume, Mathematical prediction.

Identifiers: Northeast Corridor, Short haul air transportation.

The study presented in this report is concerned with establishing the potentials of air transportation in the 1970-80's as related to the transportation demands in the Northeast Corridor. A complete systems analysis was undertaken, including the determination of optimum vehicle characteristics, estimation of future direct operating costs, management information requirement scheduling and ground facilities, leading to an estimate of the indirect costs of operating a short haul air system, and the possible fares and travel times. The total system capital investment in vehicles, terminals, navigation equipment, maintenance facilities, etc., was estimated. Current values in 1965 dollars were used in this report. Advanced concepts of engines, aircraft and computer technologies anticipated for the 1970-80 period were taken into consideration in the analysis. (Author)

PB-169 554 **Field 1E, 13L**
CFSTI Prices: HC$6.00 MF$1.25
California Univ., Berkeley. Inst. of Transportation and Traffic Engineering.
EVALUATION OF RUNWAY LIGHTING SYSTEMS FOR EFFECTIVENESS IN DENSE FOG.
Final rept.,
by D. M. Finch, R. Horonjeff and H. G. Paula.
Jan 66, 229p
Contract FAA/ARDS-434,
Proj. 430-202-01E
SRDS RD-65-58

Descriptors: (*Runways, Marker lights), (*Marker lights, Runways), (*Fog, Aircraft landings), Effectiveness, Visibility.

Tests of runway lighting systems in dense fog show that an intensity of 200 to 300 cp, now in general use for centerline lights at U. S. airports, is not high enough for effective guidance in a fog density of 1200-ft visual range, day or night. These tests also indicate that in daytime, with a 1200-ft visual range, runway marking is considerably useful to pilots as a supplement to runway lighting. In addition, on the basis of pilots' reactions, the present U. S. standard pattern (3:3:3) for touchdown-zone and centerline lights was found to be more effective than either of two other patterns (3:2:1 and 7:3:1) evaluated. Pilots also preferred a modified version of the present U. S. standard approach-light system. The tests were performed in a specially designed facility using artificially produced fog and a linear scale reduction factor of 1/10. Evaluations were made from pilot observations, as well as photometric-measurement and photographic techniques. The test facilities and methods are described, the test results are presented, and some of the influencing factors, such as background brightness and cockpit cutoff angle, are discussed. In addition, a number of recommendations are made with regard to intensities and photometric distributions for runway lights, and with respect to changes in the present U. S. standard approach light system. (Author)

2. AGRICULTURE

PB-169 706 **Field 2E**
CFSTI Prices: HC$2.00 MF$0.50
Oregon State Univ., Corvallis. Agricultural Experiment Station.
BEEF CATTLE FEEDLOTS IN OREGON: A FEASIBILITY STUDY.
Mar 64, 47p Special rept. no. 170
Prepared in cooperation with Farmer Cooperative Service, Dept. of Agriculture, Washington, D. C.

Descriptors: (*Bouines, Beef), (*Beef, Oregon), (*Oregon, Beef), Food, Costs, Feasibility studies, Agriculture.

The purpose of this study is to show costs and returns that might have prevailed from 1956 through 1963 for commercial beef cattle fattening operations in Wasco and Sherman Counties in particular and in Oregon in general. This information is designed to show probable net returns and how they varied from month to month and year to year. Feasibility of this industry is thus determined. This study shows that beef cattle feeding operations in the Wasco-Sherman County area and in Oregon generally are feasible. There may be feeding periods when losses rather than profits result, but over a number of years, if past price-cost relations generally prevail, commercial beef cattle feeding in Oregon should be encouraged.

3. ASTRONOMY AND ASTROPHYSICS

N66-13364 **Field 3B**
CFSTI Prices: HC$5.00 MF$1.00
Arizona Univ., Tucson.
COMMUNICATIONS OF THE LUNAR AND PLANETARY LABORATORY, VOLUME 3, NUMBER 50,

by D. W. G. Arthur. 1965, 163p
Grant NsG-161
NASA CR-68590

Descriptors: (*Moon, Terrain).

N66-13382 **Field 3A**
CFSTI Prices: HC$5.00 MF$1.00
Research Labs. Div., Bendix Corp., Southfield, Mich.
MASS SPECTROMETER FOR LUNAR ANALYSIS STUDY.
Final summary rept., 1 Jun-31 Aug 63,
by L. D. Ferguson, G. J. Ohalloran, F. W. Poblenz, and L. Walker. 30 Nov 63, 165p RLD-2542
Contract NAS8-5370
NASA CR-68624

Descriptors: (*Moon, Atmosphere), Mass spectrometers.

N66-14962 **Field 3A**
CFSTI Prices: HC$3.00 MF$0.75
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
TWO EXPERIMENTS YIELDING LUNAR SURFACE INFORMATION EMPLOYING POLARIZED RADAR WAVES,
by D. E. Barrick. 15 Aug 65, 62p Rept. no. 1388-17
Grant NsG-213
NASA CR-69202

Descriptors: (*Moon, Terrain), (*Electromagnetic waves, Scattering).

N66-15052 **Field 3A**
CFSTI Prices: HC$1.00 MF$0.50
Hawaii Inst. of Geophysics, Honolulu. Astrogeophysics Div.
ZODIACAL LIGHT.
Summary rept,
by J. L. Weinberg. 3 Aug 64, 21p HIG-64-11
Grant NsG-676
NASA CR-58323

Descriptors: (*Zodiacal light, Brightness), (*Bibliographies, Zodiacial light).

N66-15068 **Field 3B**
CFSTI Prices: HC$4.00 MF$0.75
Southwest Center for Advanced studies, Dallas, Tex.
MULTIDISCIPLINARY RESEARCH IN SPACE-RELATED SCIENCE AND TECHNOLOGY.
Semiannual rept.
30 Sep 65, 108p EPS-65-2
Grant NsG-269-62
NASA CR-69137
Research supported in part by AF, Navy and NSF.

Descriptors: (*Atmosphere, Analyses), Moon, Earth, Planets.

4. ATMOSPHERIC SCIENCES

AD-444 416 **Field 4B, 16A, 19D**
CFSTI Prices: HC$3.60
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex.
METEOROLOGICAL DATA REPORT AEROBEE KP 3.4, 7 APRIL 1964,
by Marjorie McLardie Hoidale. May 64, 37p
ERDA-143
Task 1-G-6-50212-A-127-02
N64 32124

Descriptors: (*Sounding rockets, Atmospheric sounding), (*Atmospheric sounding, Sounding rockets), (*Meteorological parameters, Upper atmosphere), Launching, Ballistics, Tables, Wind, Performance (Engineering), Meteorology.

Identifiers: Aerobee.

Meteorological data gathered for the launching of Aerobee KP 3.4 are presented for the U. S. Naval Research Laboratory, the Kitt Peak National Observatory, and for ballistic studies. The data appear, along with calculated ballistic data. In appendixes. (Author)

AD-459 467 **Field 4A**
CFSTI Price: HC$2.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
THE EFFECT OF COLLISION ON THE GROUP REFRACTIVE INDEX OF THE IONOSPHERE.
Technical memo.,
by V. L. Pisacane and J. D. Stuart. Jan 65, 21p TG-649
Contract NOw-62-0604-c

Descriptors: (*Ionosphere, Refractive index), (*Refractive index, Ionosphere), Electron density, Magneto-optic effect, Atmospheric refraction, Numerical analysis.

An expression from which the group index of refraction may be calculated when the collision frequency is small but not negligible is discussed. Various approximations are made to this expression for special cases: the quasi-longitudinal, quasi-transverse, pure longitudinal, pure transverse, and field free propagation. When the collisions are neglected, then approximations reduce to well known formulae. A Maclaurin series expansion shows that the group index of refraction is independent of the first power of the collision frequency. (Author)

AD-466 638 **Field 4A, 22B**
CFSTI Prices: HC$3.60 MF$0.50
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
LOW-ENERGY PROTON AND ELECTRON EXPERIMENT FOR THE ORBITING GEOPHYSICAL OBSERVATORIES B AND E.
Progress rept.,
by L. A. Frank. Jul 65, 38p Rept. no. 65-22
Contract Nonr-1509 (06), Grant NsG-233-62

Descriptors: (*Scientific satellites, Radiation measurement system), (*Atmospheric sounding, Scientific satellites), (*Space environmental conditions, Radiation measurement systems), Protons, Electrons, Measurement.

The experiment utilizes cylindrical curved-plate electrostatic analyzers to provide measurements of the differential energy spectrums of protons and electrons within and in the vicinity of the earth's magnetosphere. Continuous channel multipliers (Bendix 'Channeltrons') are used to count individual charged particles accepted by the analyzers and provide the instrument with a dynamic range in proton and electron intensities extending from 10,000 to 10 to the 10th power/ (sq cm-sec-sr) in a given energy bandpass of the electrostatic analyzer. The widths of the energy bandpasses of the electrostatic analyzers are sufficiently wide to cover the entire energy range extending from 90 eV to 70,000 eV (protons and electrons separately) in 14 voltage steps on the curved plates. The four electrostatic analyzers (two analyzers each for protons and electrons covering the above energy range) complete with signal conditioner, high-voltage power supplies, and thermal shell require an average power of 2 watts and an instrumental weight of 6.3 pounds. (Author)

AD-466 651 **Field 4A, 4B, 22B**
CFSTI Prices: HC$28.20 MF$1.50
Army Electronics Research and Development Activity, White Sands Missile Range, N. Mex.
METEOROLOGICAL ROCKET NETWORK FIRINGS. VOLUME XXXIX. NOVEMBER 1964 FIRINGS.
Data rept.
Aug 62, 286p IRG document-109-62

Descriptors: (*Sounding rockets, Atmospheric sounding), (*Atomospheric sounding, Sounding rockets), (*Upper atmosphere, Meteorological parameters), Research program administration, Meteorology, Data, Tables, Graphics.

The Meteorological Rocket Network (MRN) combines the investigative efforts of a number of meteorological organizations engaged in upper atmospheric studies. The necessary coordination has been effected by the Inter-Range Instrumentation group (IRIG) through its Meteorological Working Group (MWG). The Meteorological Rocket Network Committee (MRNC) was formed in October 1959 to implement the necessary actions required to weld these diverse cooperating groups into an effective research network for upper atmospheric exploration. The MRNC has played an active role in coordinating the planning, implementation, data processing, and publication of the data acquired under the auspices of the MRN. (Author)

AD-467 092 **Field 4A, 14B**
CFSTI Prices: HC$1.60 MF$0.50
General Dynamics/Convair, San Diego, Calif.
RE-ENTRY PHYSICS RESEARCH.
Semi-annual technical summary rept.
Jun 65, 19p GD/C-DBE65-012 (1)
Contract DA-01-021-AMC-12050 (Z), ARPA Order-393

Descriptors: (*Reaction kinetics, Shock waves), (*Shock waves, Kinetic theory), Atmosphere entry, Shock tubes, Recombination reactions, Carbon compounds, Oxygen compounds, Oxygen, Carbon dioxide, Oxidation, Ozone, Handling, Upper atmosphere, Shock tubes, Carbon monoxide.

The subjects discussed include status reports on shock tube studies of radiative recombination of CO and O at atmospheric pressures, carbon monoxide oxidation at low pressures and analyses of the kinetics of carbon monoxide oxidation with emphasis on the design and construction of an ozone synthesizing and handling system, optical and spectroscopical equipment for absolute intensity measurements in the ultraviolet, visible and near infrared regions of the spectrum and the design and performance characteristics of a cold gas driven, 24 in. diameter shock tube facility for studies of gases with low contamination levels. (Author)

AD-467 545 **Field 4B, 16A, 19D**
CFSTI Prices: HC$18.40 MF$1.00
Inter-Range Instrumentation Group, White Snads Missile Range, N. Mex.
METEOROLOGICAL ROCKET NETWORK FIRINGS. VOLUME XXI. MAY 1963 FIRINGS.
Data rept.
Oct 64, 188p IRIG Document-109-62
See also AD-444 416.

Descriptors: (*Sounding rockets, Atmospheric sounding), (*Atmospheric sounding, Sounding rockets), (*Upper atmosphere, Meteorological parameters), Ballistics, Guided missile ranges, New Mexico, Meteorology, Tables, Graphics.

The Meteorological Rocket Network (MRN) combines the investigative efforts of a number of meteorological organizations engaged in upper atmospheric studies. The necessary coordination has been effected by the Inter-Range Instrumentation Group (IRIG) through its Meteorological Working Group (MWG). The Meteorological Rocket Network Committee (MRNC) was formed in October 1959 to implement the necessary actions required to weld these diverse cooperating groups into an effective research network for upper atmospheric exploration. The MRNC has played an active role in coordinating the planning, implementation, data processing, and publication of the data acquired under the auspices of the MRN. (Author)

C13.46:18-18 **Field 4A**
CFSTI Price: MF$0.75
Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
QUARTERLY RADIO NOISE DATA, MARCH, APRIL, MAY, 1963.
Technical note,
by W. Q. Crichlow, R. T. Disney and M. A. Jenkins 25 Jul 64, 95p NBS-TN-18-18
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.50.

Descriptors: (*Noise (Radio), Measurement), (*Radiofrequency interference, Measurement), Tables.

C13.46:226 **Field 4A**
CFSTI Price: MF$0.50
Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
AN ATLAS OF VLF EMISSION SPECTRA OBSERVED WITH THE 'HISS RECORDER'.
Technical note,
by Jean A. Koch and V. Christine Edens. 13 Nov 64, 30p NBS-TN-226
N65 17043
Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402, $0.40.

Descriptors: (*Whistlers, Catalogs), (*Very low frequency, Whistlers), Noise (Radio), Atmospherics.

The purpose of the atlas is to present a representative selection of long-term activity. While classifications of the different types are made, no quantitative discussion of the source of these groups of emissions is given. The term 'VLF emission event' is restricted to groups of emissions which last for at least 15 seconds, since this is the shortest period which can be easily observed by the hiss recorder. The observations are organized into four sections corresponding to four characteristics of the morphology of VLF emission activity. These are (1) VLF emission events rising in frequency, (2) simultaneous observations at several locations, (3) simultaneous observations at conjugate points, and (4) long period pulsations. (Author)

N66-13339 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Univ., Calif. Stanford Electronics Labs., Inc.
ION DISTRIBUTION AND TEMPERATURE IN THE TOPSIDE IONOSPHERE OBTAINED FROM THE ALOUETTE SATELLITE,
by T. M. Watt. 1965, 37p
Contract NGR-05-020-089, Grant NsG-30-60
NASA CR-68611

Descriptors: (*Ionosphere, Temperature), (*Electron density, Ionosphere).

Identifiers: Alouette satellite.

N66-14960 **Field 4A**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Ionospheric Research Lab.
ELECTRON DENSITY AND THE ELECTRIC FIELD IN A STEADY-STATE F-LAYER.
Scientific rept. no. 263,
by C. Comstock. 16 Jan 66, 32p
Grant NsG-134-61
NASA CR-69203

Descriptors: (*Ionosphere, Electron density), (*Electric fields, Ionosphere).

PB-169 313 **Field 4B**
CFSTI Prices: HC$5.00 MF$1.00
Astro-Electronics Div., Radio Corp. of America, Princeton, N. J.
WORLD WEATHER SYSTEM COST/PERFORMANCE ANALYSIS STUDY.
Interim rept.
13 Apr 65, 160p
Contract Cwb-11014

Descriptors: (*Weather forecasting, Systems engineering), (*Meterological instruments, Systems engineering), (*Data processing systems, Meterological parameters), (*Weather stations, Analysis), (*Weather communications, Analysis), Costs, Performance - (Engineering), Meterological charts, Radiosondes, Sounding rockets, Ships (Nomilitary), Bouys, Aircraft, Meteorological balloons, Meteorological satellites, Communication equipment.

Identifiers: World Weather System.

The report represents a summary of results achieved at the midpoint of a cost/performance analysis study of a proposed World Weather System. Considerable effort was spent on the data processing subsystem, especially on the question of single-echelon vs. multi-echelon processing. Observation subsystem studies concentrated on determining WWS needs over and above current and planned capabilities, determining how improvements in existing types of stations and sensors could fill the gap, and examining some of the technological problems of advanced sensors and platforms. Communication studies considered both satellite and non-satellite techniques (such as bouys, automatic land stations, and constant level balloon). Detailed technical and cost descriptions pertaining to the subsystem studies are included.

5. BEHAVIORAL AND SOCIAL SCIENCES

AD-286 253 **Field 5B**
CFSTI Price: HC$3.60
Massachusetts Inst. of Tech., Cambridge.
BIBLIOGRAPHIC COUPLING EXTENDED IN TIME: TEN CASE HISTORIES,
by M. M. Kessler. 20 Aug 62, 38p
Research supported in part by NSF. See also AD-278 226, -282 697, PB-163 058, -163 061.

Descriptors: (*Bibliographies, Preparation), (*Reports, Selection), Periodicals, Statistical analysis, Sources, Indexes, Theory, Information retrieval, Scientific research.

Identifiers: Citation index, Scientific information.

The methods of bibliographic coupling were applied to 8186 papers in 35 volumes of the Physical Review, (Vol. 77, 1950 to Vol. 111, 1958). The results are reported in the form of ten case histories. Each case was chosen to illustrate a problem in information retrieval. Summary of results: (1) The methods of bibliographic coupling can be applied to a large body of literature to yield meaningful grouping of papers; (2) The process operates both on the past and future literature; (3) The process has the tendency to make the list converge in time. This is equivalent to confining the search to some operational life span of the literature; (4) Second and third order processing provide an interaction between the reader and the literature; (5) The process was applied successfully to Chinese papers where the text was not available for word or content analysis.

AD-288 276 **Field 5A, 9B**
CFSTI Prices: HC$8.60
System Development Corp., Santa Monica, Calif.
LEVIATHAN: AN EXPERIMENTAL STUDY OF LARGE ORGANIZATIONS WITH THE AID OF COMPUTERS.
Technical memo.,
by Beatrice K. Rome and Sydney C. Rome. 17 Aug 62, 88p TM-744
Prepared for publication in Proceedings of Congress on the Information System Sciences (1st), Hot Springs, Va., November 18-21, 1962. See also AD-608 587.

Descriptors: (*Social communication, Simulation), (*Management engineering, Models (Simulations)), Military organizations, Man-machine systems, Decision making, Computers, Industries.

Identifiers: LEVIATHAN, Organizations.

Leviathan is a unique experimental approach to the study of large-scale organizations. Leviathan is a concept, a laboratory facility, and a set of computer programs. The concept provides an idealized framework for such large social groups as a military command, a government bureau, of an industrial corporation. In real life, these groups manifest a varied, conflicting and confused interplay of power, policy, decision, authority, communication and procedure. This chaois is translated into a multi-dimensional topology amenable to investigation in a computerized laboratory. The simplicity and clarity of computer-coded expression and formulation are achieved, while preserving the hierarchical and functional complexity that characterizes social behavior in large groups. The computer serves four purposes. It represents or simulates the productive skills and behavior of the artificial agents; it provides the artificial language and communication facility for the live subjects to speak with each other and with the robots; and it provides automatic measurement, recording, and data reduction of all the behavior of managers and of the accomplishments of the robots. (Author)

AD-401 914 **Field 5B**
CFSTI Price: HC$7.60
ITT Federal Electric Corp., Paramus, N. J.
RESEARCH IN INFORMATION RETRIEVAL. AN INVESTIGATION OF THE TECHNIQUES AND CONCEPTS OF INFORMATION RETRIEVAL.
Quarterly rept. no. 2, 1 Oct-31 Dec 62,
by Alfred Trachtenberg, Quentin A. Darmstadt, andGeorge Greenberg. 31 Jan 63, 75p Technical rept. P-AA-TR-0031
Contract DA-36-039-sc-90787
See also AD-437 924.

Descriptors: (*Information retrieval, Scientific research), Analysis, Theory, Subject indexing, Mathematical models, Reports, Classification, Probability, Analysis of variance, Vocabulary.

Identifiers: File structures, Relevance (Documentation), Descriptors.

The general problems of information storage and retrieval are reviewed to establish a framework for the development of general theoretical principles. Several functional characteristics of the preliminary model--the representation of file items, file organization, system design and synthesis, and relevance--are summarized in terms of tentative solutions and their attendant difficulties. Specific aspects of the problem--information theoretical methods of document categorization and corrective procedures for automatic indexing--are examined in detail. (Author)

AD-403 813 **Field 5J**
CFSTI Price: HC$1.10
Personnel Research Lab. (6570th), Aerospace Medical Div., Lackland AFB, Tex.
JAN: A TECHNIQUE FOR ANALYZING GROUP JUDGMENT,
by Raymond E. Christal. Feb 63, 10p PRL-TDR-63-3
Proj. AF-7734

Descriptors: (*Group dynamics, Decision making), (*Decision making, Group dynamics), Psychometrics, Reasoning, Selection, Job analysis, Mathematical prediction.

This paper indicates how a technique which clusters criteria in terms of the homogeneity of their prediction equations can be used to identify and describe the rating policies within a group or board of judges. The technique measures the consistency of ratings obtained from individual judges, and in-

dicates the amount and nature of agreement between judges or groups of judges. A practical method is suggested for helping a board or committee to reach a consensus concerning how relevant factors shall be weighted in future situations so as to carry out its final joint policy. Examples are given to show how the technique can be used to determine the composition of a service school selection composite, to determine factor weights for a job evaluation plan, and to determine how relevant factors should be combined into a job-oriented criterion composite. (Author)

AD-404 760 **Field 5B, 9B**
CFSTI Prices: HC$2.60
System Development Corp., Santa Monica, Calif.
APPLIED INFORMATION MANAGEMENT SYSTEM USER'S MANUAL.
Technical memo.,
by Elmer W. Heller. 23 Apr 63, 26p TM-1201/000/00

Descriptors: (*Information retrieval, Instruction manuals), Indexes, Classification, Engineering.

Identifiers: Descriptors.

AIMS (Applied Information Management System), an information storage and retrieval system used by the Engineering Department at SDC, is described. AIMS inputs are descriptors manually selected from the body and title of documents by a technique not requiring professional subject matter or abstracting skill. Outputs are special computer generated indexes to locate information stored. The most important is the Permuted Descriptor Index. The most common information handled by AIMS consists of SDC documents, technical articles, manuals and catalogs, correspondence, and the standard office files.

AD-424 911 **Field 5B, 9B**
CFSTI Prices: HC$3.60
System Development Corp., Santa Monica, Calif.
AUTOMATIC DOCUMENT CLASSIFICATION. PART II. ADDITIONAL EXPERIMENTS.
Technical memo.,
by Harold Borko and Myrna Bernick. 18 Oct 63, 32p TM-771/001/00
Pub. in Jour. of the Association of Computing Machinery, v.2 (no.2) Apr 64. (See also AD-290 528).

Descriptors: (*Reports, Classification), (*Information retrieval, Automation), Automatic, Factor analysis, Subject indexing, Information retrieval.

Identifiers: Bayes' theorem, Indexing terms.

The study reports the results of a series of experiments in the techniques of automatic document classification. Two different classification schedules are compared along with two methods of automatically classifying documents into categories. It is concluded that, while there is no significant difference in the predictive efficiency between the Bayesian and the Factor Score methods, automatic document classification is enhanced by the use of a factor-analytically-derived classification schedule. Approximately 55% of the documents were automatically and correctly classified. (Author)

AD-430 881 **Field 5D, 5J**
CFSTI Price: HC$30.40
RAND Corp., Santa Monica, Calif.
KREMLIN MOODS,
by Nathan Leites. Jan 64, 308p RM-3535-ISA
Contract SD-79, ARPA Order-189-61

Descriptors: (*USSR, Attitudes), (*Social communication, USSR), (*Political science, USSR), Communism, Speech, Sociology, Social psychology, Government (Foreign), Foreign policy.

This Memorandum is a study of the published statements of various Bolshevik leaders, particularly Premier Khrushchev, up to the close of 1962. The Soviet statements with which this analysis is concerned are in many instances of a sort that Bolsheviks themselves would not regard as their most important political communications, but they are nonetheless revealing of politically relevant Bolshevik feelings and moods. The concern here is only partly with ideology. When Bolsheviks speak of their ideology, they ordinarily restrict themselves to those beliefs that are at once (1) fully conscious, (2) expressive of the tenets of Marxism-Leninism, and (3) explicitly formulated for some level of communication, whether it be with the whole world listening or within the Presidium, if not in some even more private context. The beliefs analyzed here are frequently less consciously held, less derivative of official doctrine, less fully formulated.

AD-436 528 **Field 5I, 9B**
CFSTI Prices: HC$6.60
System Development Corp., Santa Monica, Calif.
SYSTEM DESIGN FOR A CONTINUOUS PROGRESS SCHOOL: PART I.
Technical memo.,
by Robert L. Egbert and John F. Cogswell. 28 Feb 64, 56p TM-1493/103/00
Grant HEW-7-14-9120-217
See also AD-401 454, AD-436 645.

Descriptors: (*Education, Systems engineering), Design, Simulation, Test methods, Data processing systems, Students, Language, Speech.

Identifiers: Systems analysis.

This is the first of a series of reports on a system analysis of the Continuous Progress High School. In this initial document, after presenting a brief background, the following topics are discussed and illustrated by flow charts: An overview of the Continuous Progress School; generalized picture of student movement through the school; preregistration and registration procedures; course work in language arts and speech; and special academic functions of testing, scoring and interpretation. (Author)

AD-436 645 **Field 5I, 9B**
CFSTI Prices: HC$1.10
System Development Corp., Santa Monica, Calif.
NEW SOLUTIONS TO IMPLEMENTING INSTRUCTIONAL MEDIA THROUGH ANALYSIS AND SIMULATION OF SCHOOL ORGANIZATION.
Technical memo.,
by John F. Cogswell, Robert L. Egbert, Donald G. Marsh, and Frank A. Yett. 24 Mar 64, 9p TM-1809
Grant HEW-7-14-9120-217

Descriptors: (*Education, Systems engineering), (*Training devices, Automation), (*Teaching machines, Education), Analysis, Students, Theory, Simulation, Scheduling, Design, Group dynamics, Test methods, Language, Data processing systems.

Five schools are being analyzed and a school computer-simulation vehicle is being developed. Design recommendations developed in the analyses will be provisionally tested with the simulation vehicle. It is expected that this research will yield findings that can be generalized to other schools. The study should help in recommending essential roles for various personnel in schools that apply different types and configurations of educational media. It should provide estimates of the effect of media and organizational plans on such variables as the amount of teacher-pupil and pupil-pupil interaction. The characteristics of students graduating from schools in which the organization of instruction is markedly changed should also be suggested. (Author) (Presented at the Western Psychological Assn. Meeting, Portland, Oregon, 18 Apr 64)

AD-442 041 **Field 5C, 5D**
CFSTI Prices: HC$4.60
RAND Corp., Santa Monica, Calif.
THE COURSE OF U. S. PRIVATE INVESTMENT IN LATIN AMERICA SINCE THE RISE OF CASTRO,
by Lland L. Johnson. May 64, 45p RM-4091-ISA
Contracts SD-79, ARPA Order-189-61

Descriptors: (*Latin America, Commerce), (*Commerce, Latin America), (*Political science, Latin America), Economics, Government (Foreign), Communism, Industries.

This study is concerned, first, with investigating the pattern of investment flow in recent years. Second, it treats several possible explanations for the pattern that does emerge from the empirical analysis. Third, it relates this analysis to the role of U.S. private investment in the Alliance for Progress. In analyzing the historical record, the study treats four sets of time series data relating to U.S. business activities in the 20 Latin American republics. The statistical analysis discloses that little if any decline in aggregate direct investment has taken place in recent years. Considering manufacturing investment separately, we find no decline for Latin America in the aggregate. Among the major countries, Mexico and Argentina have enjoyed continuing large investment flows; Venezuela and Brazil have suffered some decline, but the record for these countries is ambiguous.

AD-443 751 **Field 5B, 9B**
CFSTI Prices: HC$1.10
System Development Corp., Santa Monica, Calif.
EXPERIENCE WITH EDP SUPPORT OF INDIVIDUALS' FIRE MAINTENANCE.
Professional paper,
by Everett M. Wallace. 7 Jul 64, 8p SP-1646

Descriptors: (*Catalogs, Maintenance), (*Management engineering, Catalogs), (*Information retrieval, Manage ment engineering), Maintenance personnel, Indexes, Data storage systems.

Experimental work was conducted on an information storage and retrieval system that would use computer support to aid the individual scientist in more effective maintenance of his personal files. An indexing support system, programmed for an IBM-1401, was designed to accept indexing information provided by each user and to produce a variety of listings for him at regular intervals. Initially the user manually selected descriptors from documents and entered them onto formatted log sheets; this input was then keypunched and processed. The alphabetical listings or indexes were printed out by names and either by descriptor or data elements. The indexes included data for 7 fixed fields: user identification and control instructions, 4 descriptor, name or author, and numerical data. A program was finally developed that offered (1) provision for combining two or more 12-character fields and for dealing with fixed fields of diverse length, (2) permutation of as many as 10 descriptor fields and 4 author fields, (3) flexible output formatting conventions to permit specification of format for listing.

AD-443 774 **Field 5B**
CFSTI Prices: HC$1.60
System Development Corp., Santa Monica, Calif.
RAPID, A SYSTEM FOR RETRIEVAL THROUGH AUTOMATED PUBLICATION AND INFORMATION DIGEST.
Professional paper,
by Louise Schultz. 1 Jun 64. 16p SP-1678/000/00

Descriptors: (*Information retrieval, Scientific research), Newspapers, Automation, Data processing systems, Systems engineering.

Identifiers: Scientific information.

The paper describes a conceptual model for an advanced information system that can improve dis-

semination without increasing storage problems. Referred to as RAPID (Retrieval through Automated Publication and Information Digest), the concept comprises a coordinated, semiautomated dissemination and retrieval system built around a special science newspaper. The RAPID concept is described in terms of its applicability to a technical and management community of broad subject base, large size, and geographic dispersion. A comprehensive, but preliminary, system diagram is provided in support of the generalized description. (Author)

AD-462 334 **Field 5I**
CFSTI Prices: HC$2.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
PERSONNEL INVENTORY (A REPORT ON AN AUTOMATED INDEX TO MANPOWER).
Technical memo,
by Robert A. Dickmann. Jan 65, 29p TG-647
Contract NOw-62-0604-c

Descriptors: (*Labor, Indexes), (*Personnel, Inventory), Automation, Data processing systems, Personnel management, Job analysis.

The purpose and problems of an automated index to manpower are presented, and four criteria for the elimination of these problems are listed. An explanation of ALGONE. APL's personnel inventory program, is given outlining in some detail the application of ALGONE to the search, print, and edit functions of APL's Information Storage Package. Finally, ALGONE's present value and future potentialities are given. (Author)

AD-463 918 **Field 5E, 5J, 19C**
CFSTI Prices: HC$2.00
Human Engineering Labs., Aberdeen Proving Ground, Md.
THE EFFECTS OF CONFINEMENT ON THE PERFORMANCE OF COMBAT RELEVANT SKILLS: SUMMARY REPORT,
by Samuel A. Hicks. Dec 64, 44p Technical memo. TM-16-64
AD 463 918

Descriptors: (*Confined environments, Performance (Human)), (*Military personnel, Performance (Human)), (*Armored vehicles, Human engineering), Design, Performance tests.

The report summarizes the results of a program on confinement in Armored Personnel Carriers. The report relates individual studies to one another and discusses the results as they apply to the goals of the overall program. Vehicle design deficiencies are cited and discussed. (Author)

AD-467 964 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE EFFECT OF NON-SCORED ITEMS AND RETESTING ON THE TAYLOR MANIFEST ANXIETY SCALE.
Research rept.,
by Robert B. Voas. 15 Mar 55, 5p
NM 001-108-100-10

Descriptors: (*Personality, Psychometrics), (*Psychometrics, Anxiety), Test construction (Psychology), Statistical analysis, Fatigue (Physiology), Correlation techniques.

The Minnesota Multiphasic Personality Inventory (MMPI Form) and the 50 items of the Taylor scale without filler items (Short Form) were administered to six classes (total N = 353) of naval aviation cadets during their first week of training at Pensacola. The present results indicate that nonscored items do not significantly effect the A scale scores, and, therefore, the three forms of this scale should yield comparable results. Further, the results show that while the correlation between the first and second administrations of this scale is high, caution should be exercised in studies which require the repetition of the anxiety scale since repetition alone produces, not a random, but a consistent effect on the mean.

AD-467 965 **Field 5J, 12A**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
A GRAPHIC METHOD FOR DETERMINING THE MEAN DIFFERENCE REQUIRED FOR SIGNIFICANCE IN BISERIAL ITEM ANALYSIS.
Research rept.,
by Robert F. Lockman. 15 Mar 55, 3p
NM 001-108-100-09

Descriptors: (*Psychometrics, Nomographs), (*Nomographs, Psychometrics), Statistical analysis.

Although graphic methods have been devised for the rapid calculation of biserial (and point biserial) correlation coefficients the mean difference between dichotomous groups (e.g., pass and fail) can be evaluated by determining biserially the initial discriminating ability of any test item. Accordingly, a nomograph was constructed from which the mean differences necessary for biserial significance at the 5 and 10 per cent levels can be obtained with 36 to 200 cases and several dichotomous cuts. A K value, the ratio of the biserial standard error to pa/y, was computed for both significance levels in conjunction with p values of 0.5, 0.7, 0.8, and 0.9 and N s of 36, 64, 100, 150, and 200. The nomograph can also be used when knowledge of the mean difference required for significance is desired in any biserial analysis.

AD-468 192 **Field 5I, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
DEVELOPMENT OF AN INTERMEDIATE CRITERION OF SUCCESS IN NAVAL AIR TRAINING.
Research rept.,
by John A. Creelman. 10 Oct 56, 9p
NM 001-108-100-18

Descriptors: (*Aviation personnel, Selection), Psychometrics, Naval training, Acceptability, Achievement tests, Performance (Human).

The feasibility of employing intermediate criteria as satisfactory substitutes for the present pass-fail criterion was determined. It was found that a satisfactory substitute of pass-fail validity is furnished by pass-fail at the end of primary flight training. This would effect a savings of about ten months in completing longitudinal studies of the predictive validity of selection measures. (Author)

AD-468 236 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE SIGNIFICANCE OF ATTITUDES TOWARD PEERS IN DISCRIMINATION BETWEEN NAVAL AVIATION CADETS OF 'HIGH' AND 'LOW' MOTIVATION.
Research rept.,
by John T. Bair and Edwin P. Hollander. 1 Aug 52, 23p
NM 001-058.05.04

Descriptors: (*Attitudes, Aviation personnel), (*Motivation, Attitudes), Group dynamics, Behavior, Naval training, Personality, Statistical analysis.

The investigation reports the significance of attitudes toward peers that differentiated between cadets of 'high' and 'low' motivation. The 'high' motivation group consisted of 65 cadets who successfully completed Basic Flight Training, and the 'low' group included 72 cadets who left the program voluntarily. Both groups were required to complete an open-ended questionnaire which instructed that they evaluate anonymously the characteristics of their 'best' and 'worst' fellow cadets. Specific content categories were determined and checked for reliability by independent observers. The results revealed that the 'high' motivation group appraised personal and social factors of their fellow cadets with significantly greater frequency. In contrast, the 'low' motivation group described academic values more frequently. Implications for a counseling program are included. (Author)

AD-468 311 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Central Inst. for the Deaf, St. Louis, Mo.
CHANGES IN PSYCHOPHYSIOLOGICAL RESPONSES PRODUCED BY DELAYED SPEECH FEEDBACK.
Research rept.,
by Donald G. Doehring. 28 Oct 56, 16p
Contract Nonr-1151 (02),
Proj. NR-146-092
NM 001-102-502-1

Descriptors: (*Psychophysiology, Speech), (*Speech, Psychophysiology), Stress (Physiology), Speech transmission, Feedback, Stress (Psychology), Reaction (Psychology), Pulse rate, Galvanic skin response, Respiration, Muscles.

Identifiers: Delayed speech.

Certain responses to the stress of speaking with delayed feedback were compared with responses to the lesser stress of speech with direct feedback. Response measures were forearm and forehead tension, GSR, heart rate, respiration rate, and blink rate. Both experimental conditions were found to produce changes in response in the direction of a stress reaction, with delayed feedback producing a significantly larger change in heart rate, blink rate, and GSR, as compared with the direct feedback measures. (Author)

AD-468 312 **Field 5J**
CFSTI Prices: HC$1.00 MF$0.50
Central Inst. for the Deaf, St. Louis, Mo.
THE METHOD OF 'SINGLE DESCENT' IN GROUP AUDIOMETRY.
Research rept.,
by W. Dixon Ward. 26 Oct 56, 21p
Contract Nonr-1151 (02),
Proj. NR-146-092
NM 001-102-502-2

Descriptors: (*Audiometry, Test methods), Deafness, Hearing, Thresholds (Physiology), Jet engine noise, Auditory perception, Reliability.

Identifiers: Group testing.

Various methods for determining threshold in a group testing situation were compared. No sifnificant differences in reliability were found between the method of adjustment (either direct or indirect) and the method of 'single descent,' in which the listener presses a button 'just when the beeps disappear.' However, the method of single descent is independent of individual differences in adjustment time and requires a minimum of apparatus. Thresholds determined by single descent were affected only slightly by rate of descent, starting level and practice factors. A comparison between single descent and the standard clinical technique showed the thresholds to be valid. Field performances of the method, in a 10-man group audiometer, has fulfilled expectations from the pilot studies. (Author)

AD-470 103 **Field 5B**
CFSTI Prices: HC$3.00 MF$0.75
Research Analysis Corp., McLean, Va.
AUTOMATED DOCUMENTATION.
Technical paper,
by Robert A. Magnuson. Apr 65, 76p RAC-

TP-165
Contract DA-44-188-ARO-1

Descriptors: (*Documentation, Automata), Automation, Computers, Feasibility studies, Preparation.

Realizing that RAC's only tangible products are technical papers and that the present manual methods of draft and document production are impediments to the swift preparation of a large technical document, the author designed and implemented the computer-assisted system herein described. The system design embodies a number of brand-new ideas-ideas not contained within any other known system, program, or device whose purpose is to compose or typeset documents. These innovations include free-form keypunching, the concept of the voided area, and the freely commingled English-like editing instructions and text. As a result the keypunching of a draft is actually easier than either typing (onto paper) or traditional keypunching (into cards). Corrections (i.e., changes, insertions, deletions, and rearranging) of a draft are made at the key punch; there is no need to count pages, lines, words, or characters and then to keypunch these counts into special change-instruction cards that must later be processed and interpreted by the computer. The system, considered to be a working prototype, is now undergoing an extensive operational test and development. It has, for example, produced the body of this very technical paper. Soon the system will be expanded to include new capabilities, some of them described in this paper. (Author)

N66-13331 **Field 5E**
CFSTI Prices: HC$5.00 MF$1.00
American Inst. for Research, Pittsburgh, Pa. Inst. for Performance Technology.
HUMAN FACTORS INFORMATION REQUIREMENTS FOR SPACE SYSTEM DEVELOPMENT.
Final rept.,
by J. W. Altman. Jun 64, 173p
Contract NASR-194
NASA CR-68616

Descriptors: (*Systems engineering, Human engineer ing), Spacecraft, Human engineering), Bibliographies.

N66-13338 **Field 5B**
CFSTI Prices: HC$6.00 MF$1.25
North American Aviation, Inc., Los Angeles, Calif.
NONDESTRUCTIVE TESTING THEORY AND APPLICATION FOR COMPOSITES. BIBLIOGRAPHY.
15 Oct 65, 219p NA-65-813
Contracts NAS8-11733, AF 33-615-2865
NASA CR-68604

Descriptors: (*Composite materials, Nondestructive testing), (*Non-destructive testing, Composite materials).

N66-13375 **Field 5A**
CFSTI Prices: HC$3.00 MF$0.75
American Machine and Foundry Co., Santa Barbara, Calif. Advanced Products Group.
SPACE TECHNOLOGY APPLIED TO MAN'S EARTHLY NEEDS. A FEASIBILITY STUDY ON THE TRANSFER OF AEROSPACE TECHNOLOGY TO INDUSTRY USE,
by A. W. Brock, W. J. Dembiczak, and A. Nagy.
Apr 65, 81p ER-SB-1844
Contract NASw-1139
NASA CR-68620

Descriptors: (*Astronautics, Industries), (*Industries, Astronautics), Information retrieval.

Patent 3,229,017 **Field 5I**
HORIZONTAL SITUATION DISPLAY FOR RADAR SCOPE INTERPRETATION TRAINER.
Patent assigned to Navy,
by Ralph W. Snyder. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Display systems, Radar trainers), Patents, Radar target position simulators.

The radar scope interpretation trainer achieves the radar scope presentation situation displays by utilizing a plurality of projectors, three in number, to project, on a common screen via a plurality of transparencies, four in number, the silhouette images of a simulated target bomber, a simulated intercepter, the particular radar antenna beam pattern utilized by the simulated interceptor, and a range scale.

PB-169 216 **Field 5G**
CFSTI Prices: HC$1.00 MF$0.50
Indiana Univ., Bloomington. Linguistics Research Project.
PROBLEMS OF SELECTION IN TRANSFORMATIONAL GRAMMAR,
by F. W. Householder, Jr. and P. H. Matthews.
1965, 13p
Grant NSF-GS-108
Prepared in cooperation with University Coll. of North Wales, Bangor, Dept. of Linguistics.

Descriptors: (*Transformational grammars, Selection), Linguistics, Great Britain.

The paper is concerned with two related problems: how can one best handle, in a transformational grammar, (1) Restrictions on the collocability of one word with another, and (2) Cases where the selection of a certain word (or n-tuple of words) yields an ungrammatical (or improbable) kernel, but at least some grammatical (and probable) transforms.

PB-169 230 **Field 5B, 5F**
CFSTI Prices: HC$1.00 MF$0.50
Centre National de la Recherche Scientifique, Paris (France).
LES APPLICATIONS DE LA MECANOGRAPHIE DANS LA DOCUMENTATION ARCHEOLOGIQUE,
by J. C. Gardin. 1960, 12p
NSF Scientific Documentation Project.

Descriptors: (*Documentation, Archaeology), (*Archaeology, Data processing systems), Automatic, France.

PB-169 294 **Field 5G**
CFSTI Prices: HC$2.00 MF$0.50
Lockheed Missiles and Space Co., Sunnyvale, Calif.
ON REPRESENTING SYNTACTIC STRUCTURE.
Technical rept. on communications,
by E. R. Gammon. Jul 63, 49p Rept. no. 5-10-63-12
Work carried out as part of the Lockheed Independent Research Program.

Descriptors: (*Syntax, Analysis), Grammars, English language.

An axiomatic formulation of the concept of syntactic distance is presented. The paper begins with a general discussion of diagrammatic representations of sentences where the relative geometric distance is a function of grammatical relatedness. Distance is then specialized to depict a type of relatedness implicit in immediate constituent analyses. For example, in endocentric structures we may require that the distance from an attribute to structure exceed the distance from the head to the structure. In exocentric structures, we may require that the distances from the exocentric constituents to the structure be equal. If the words in a sentence are arranged in a space so that all the relative between-word distances are preserved, we find that the minimum dimensionality required of the space gives a new parameter for sentence complexity. If explicit numerical functions of grammatical relatedness are introduced, then the diameter of the distance-preserving graph of the sentence gives another measure of complexity closely related to Yngve's depth. In fact, with the proper distance function, the sentence depth is the maximum distance from any word to the ultimate constituent - in this case, the sentence. Conservation of dimensionality and diameter is suggested to explain the preference for certain grammatical constructions. It is shown that there are distance functions which enable us to convert immediate constituent trees into representations which are order isomorphic to the diagrams of traditional English grammar. (Author)

PB-169 297 **Field 5A, 14B**
CFSTI Prices: HC$1.25 MF$0.50
Naval Research Lab., Washington, D. C.
REPORT OF NRL PROGRESS.
Feb 66, 43p
Also available on subscription from CFSTI $10.00 per year domestic, $13.00 per year foreign.

Descriptors: (*Naval research, Reports), Body fluids, Gases, Spin, Mechanics, Metallurgy, Ceramic materials, Solid state physics, Radio equipment, Sound, Remote control systems, Patents.

Identifiers: Sealab.

PB-169 309 **Field 5E, 5J**
CFSTI Prices: HC$1.00 MF$0.50
Human Engineering Labs., Aberdeen Proving Ground, Md.
EFFECTIVENESS OF WARNING LIGHTS AS A FUNCTION OF FLASH RATE,
by Leon T. Katchmar and Nathan H. Azrin. Aug 56, 10p Technical memo. TM-23
Proj. TB-1-1000
AD 107 279

Descriptors: (*Indicator lights, Effectiveness), Light pulses, Functional analysis, Reaction - (Psychology), Frequency, Malfunctions.

An investigation of the extent to which variations in flash frequency change a warning light's effectiveness in eliciting a reaction. Ten subjects judged which flashing light they would turn off first. It was found that a warning light's effectiveness increased as a direct function of flash rate, up to a maximum of approximately 10 cps. Further increases in frequency produced a decrease in effectiveness. There is some evidence to indicate that effectiveness, apparent fluctuations, and annoyance all vary in the same way as a function of flash rate. (Author)

PB-169 317 **Field 5G, 5B, 9B**
CFSTI Prices: HC$10.60 MF$0.75
Linguistics Research Center, Univ. of Texas, Austin.
QUARTERLY PROGRESS REPORT NO. 25, 1 MAY 1965-31 JULY 1965.
Aug 65, 105p LRC-65-NSF-25
Grant NSF-GN-308
Scientific Documentation Project.

Descriptors: (*Classification, Linguistics), (*Linguistics, Data processing systems), Syntax, Programming (Computers), Analysis, Machine translation, Information retrieval, Language, Automatic.

Work is reported on programming systems which (a) maintain large stores of linguistic corpora or descriptive data, (b) perform automatic syntactic analysis, synthesis or translation, (c) prepare concordances or linguistic statistics, (d) perform automatic classification, (e) perform coordinate and associative information retrieval, and (f) process informant data. The analysis and classification capabilities are being combined in a self-organizing

linguistic system. Descriptive studies of several languages, notably English, German, Russian, Chinese and Japanese, are in progress. Theoretical work is continuing in classification theory and algorithms, with applications in time-shared associative retrieval and automatic linguistic classification. (Author)

PB-169 324 **Field 5B**
CFSTI Prices: HC$1.60 MF$0.50
Indian Statistical Inst., Bangalore (India). Documentation Research and Training Centre.
COURSE OF TRAINING IN DOCUMENTATION: PROSPECTUS AND SYLLABUS.
1962, 16p
NSF Scientific Documentation Project.

Descriptors: (*Documentation, India), (*Education, Documentation), Technical information centers.

PB-169 326 **Field 5G**
CFSTI Prices: HC$1.60 MF$0.50
Ohio State Univ., Columbus.
TWO ASPECT MARKERS IN MANDARIN,
by William S-Y Wang. 1965, 14p
NSF Scientific Documentation Project. Reprinted from Language, v41 n3 p457-70 Jul-Sep 1965.

Descriptors: (*Chinese language, Analysis), (*Grammar, Chinese language), Linguistics.

Identifiers: Mandarin.

The report presents a solution to the problem of aspect markers in Mandarin. The problem involves several seeming irregularities in the formation of negative sentences and of the so-called A-not-A questions. Essentially, the solution consists of the identification of the morph -you (as in meiyou) and the aspect marker-le as suppletive alternants of the same morpheme. In the light of this identification, it will be seen that the relations among declarative, negative, and A-not-A sentences are both simple and regular.

PB-169 409 **Field 5B, 5J**
CFSTI Prices: H$5.00 MF$1.00
Tufts Univ., Medford, Mass. Inst. for Psychological Research.
CHARACTERISTICS OF TECHNICAL REPORTS THAT AFFECT READER BEHAVIOR: A REVIEW OF THE LITERATURE,
by Paul G. Ronco, John A. Hanson, Margaret W. Raben, and Ina A. Samuels. 1964, 196p
Grant NSF-G25112
NSF Scientific Documentation Project.

Descriptors: (*Applied psychology, Documentation), (*Reports, Effectiveness), (*Reading, Behavior), Scientific research, Graphics, Flow charting, Printing, Maps, Photographs, Semantics, Syntax, Grammars, Language, Motivation, Learning, Attitudes, Performance (Human), Social communication, Information theory, Instruction manuals, Bibliographies, Abstracts, Reviews.

Identifiers: Technical writing.

Contents: Purpose, approach and plan of the report; Typographical factors and legibility; Illustrations (Graphics); Organization of the report; Language; Devices for inducing proper set; Motivational devices; Instruction-type reports; Summary and recommendations.

PB-169 411 **Field 5B, 7D**
CFSTI Prices: HC$1.10 MF$0.50
Davison (P. S.), Dunfermline (Scotland).
RECORDS OF RESEARCH AND DISCOVERY, NEGLECTED ASSETS OF SCIENCE. II. METHODS OF HANDLING CHEMICAL DATA,
by P. S. Davison. 1961, 6p
Reprinted from Research v14 p207-12 May 1961.

Descriptors: (*Chemistry, Information retrieval), (*Spectroscopy, Information retrieval), (*Informa tion retrieval, Chemistry), Chemical compounds, Spectra (Infrared), Spectra (Visible + ultraviolet), Scientific research, Documentation, Great Britain.

PB-169 416 **Field 5B, 9B**
CFSTI Prices: HC$7.60 MF$0.75
General Electric Co., Bethesda, Md. Information Systems Operation.
PROGRAM OF STUDIES ON THE USE OF PUBLISHED INDEXES. PART I. PROGRAM OF STUDIES.
Final rept., pt. 1,
by D. V. Torr, C. Fried and J. J. Prevel. 9 Feb 66, 78p
Contract NSF-C412
NSF Scientific Documentation Project. See also PB-169 417.

Descriptors: (*Indexes, Effectiveness), Classification, Subject indexing, Computers, Photographic techniques, Information retrieval, Search theory.

Identifiers: Citation index, KWIC index, Coordinate indexing, Indexing terms, User surveys, Scientific information, National Library of Medicine, Relevance- (Documentation).

The report deals with a study of the utility of different kinds of published indexes under various conditions of usage. The study is partitioned into two phases: a design phase and a management phase. The purpose of the completed design phase was to design a program of studies for the systematic investigation of the methods and results of index usage. The purpose of the management phase is to implement the program of studies under the management of a single organization. The report documents work in the accomplishment of the design phase and presents a program of studies and a summary of certain work accomplished during the design phase. The program of studies makes up the body of the report. To simplify the transition from the design phase to the management phase the individual studies which make up the program of studies have been written as work statements. The request for proposals could then reference these work statements. (Author)

PB-169 417 **Field 5B, 9B**
CFSTI Prices: HC$7.60 MF$0.75
General Electric Co., Bethesda, Md. Information Systems Operation.
PROGRAM OF STUDIES ON THE USE OF PUBLISHED INDEXES. PART II. PILOT STUDIES CONDUCTED DURING THE DESIGN PHASE.
Final rept., pt. 2,
by D. V. Torr, C. Fried, and J. J. Prevel. 9 Feb 66, 72p
Contract NSF-C412
NSF Scientific Documentation Project. See also PB-169 416.

Descriptors: (*Indexes, Effectiveness), Classification, Subject indexing, Libraries, Search theory.

Identifiers: National Library of Medicine, Library of Congress, KWIC index, Citation index.

During the design phase, methodologies were sought for investigating the real and experimental uses of indexes as was an appreciation for the problems associated with this type of data collection and analysis. Pilot studies were made that reflect differing degrees of sophistication in the conduct of studies using introspective and experimental techniques. Pilot study 1. A preliminary investigation, using the library facility at GE's Information Systems Operation. The introspective technique was used for a single assigned question with primarily one index as an information source. Pilot study 2. A study at the Library of Congress Index Room. Subjects introspected in replying to four questions selected at random from various subject areas. The subjects used a single assigned example of each of four index types. Pilot study 3. A study at the Whitney Library of GE's Advanced Technologh Center. This study was devised to obtain introspections from practicing scientists who use indexes in the course of their work. The selection of the index and the questions to be answered were to be the free choice of the scientists. This approach did not prove feasible. In its place introspections were obtained from two Information Systems Operation employees on questions of interest to themselves and with indexes of their own choosing.

PB-169 468 **Field 5G**
CFSTI Prices: HC$13.60 MF$1.00
Linguistics Research Center, Univ. of Texas, Austin.
AN AUTOMATIC PHRASE STRUCTURE ANALYSIS OFA SPANISH TEXT,
by Carolyn Beth Thomas. Sep 65, 131p LRC-65-WD-2
Grant NSF-GN-308

Descriptors: (*Spain, Language), (*Language, Spain), Context free grammars, Computational linguistics, Syntax.

A summary of morphological and syntactic classification is presented for a pilot description of Spanish in the Linguistics Research System. Sample displays are given for context-free phrase structure description and the resulting machine analysis. (Author)

PB-169 502 **Field 5I, 5A, 13B**
CFSTI Prices: HC$3.00 MF$0.50
Jorgensen (Roy) and Associates, Gaithersburg, Md.
MANAGEMENT IMPROVEMENT PROJECT 1962-1964. work sampling and manpower needs study,
13 Jan 65, 73p Rept. no. 0079
Research conducted for Indiana State Highway Commission, Indianapolis.

Descriptors: (*Personnel management, Roads), (*Roads, Personnel management), Bridges, Personnel, Classification, Design, Manpower studies, Indiana.

The report provides information about a general management improvement study of the Indiana State Highway Commission. Subject areas of the study included workload planning, organization, training, manpower projections, and highway management. Extensive use was made of exhibits including questionnaire forms, statistical charts, bar graphs, etc., which greatly facilitated the reading and understanding of the narrative format. One of the more significant areas researched was that of personnel. Personnel research investigated a career employment policy plan, manpower requirements, adequacy of existing personnel and training. (Author)

PB-169 504 **Field 5I, 13B**
CFSTI Prices: HC$6.00 MF$1.25
Virginia Military Inst., Lexington. Research Labs.
STUDY OF THE EFFECTIVENESS OF THE TRAINING PROGRAM FOR GRADUATE ENGINEERS, VIRGINIA DEPARTMENT OF HIGHWAYS,
by J. A. McDonough and J. M. Morgan, Jr. Jun 65, 204p
Contract HPR-2674
Sponsored by Virginia Highways Dept.

Descriptors: (*Engineering personnel, Roads), (*Roads, Virginia), Training, Employee relations, Personnel management.

Based on an exhaustive, two-year study of the records and opinions of almost 250 trainees, some of whom have been associated with the program since its inception, it may be concluded that: The program is too long. When compared to the nine

states having formal training programs in operation more than six years and with a trainee input of more than 100 college graduates, only one state is in a less favorable position with respect to percentage retention than Virginia. There is a definite relation between length of formal training program and retention rate. Administration of the program is of equal importance as in phase sequence and content in retaining trainee interest. Goals to be accomplished in each phase must be understandable and specific. Salary and long-range advancement possibilities have the greatest influence on resignations. Moving from one location to another must be kept to a minimum. Assignment of trainees to supervisors sympathetic with the aims of the Program is of the utmost importance. The chances of interesting an engineering college graduate in becoming a trainee increase with his prior highway experience. Initially, about one-half the trainees planned to continue employment in state highway service after completing the program. Initial fringe benefits appear to have become increasingly important to the more recently employed trainees. Fringe benefits are overwhelmingly significant or very significant to those who have completed training and continue in state employ.

PB-169 510 **Field 5C, 13B, 5D**
CFSTI Prices: HC$2.00 MF$0.50
Virginia Council of Highway Investigation and Research, Charlottesville.
CHANGES IN VIRGINIA'S HIGHWAY TAX LAWS, 1954-1964,
by H. Kendrick Sanders. Feb 65, 30p Rept. no. 0069

Descriptors: (*Virginia, Roads), (*Roads, Virginia), (*Economics, Roads), Law, Budgets, Money.

PB-169 517 **Field 5A, 13B**
CFSTI Prices: HC$5.00 MF$1.00
Peat, Marwick, Mitchell and Co., Chicago, Ill.
MISSOURI STATE HIGHWAY DEPARTMENT. MANAGEMENT STUDY.
Sep 63, 166p

Descriptors: (*Management engineering, Roads), (*Roads, Missouri), Management planning, Bridges, Personnel management.

The study presents a comprehensive study of the highway department office procedures and practices, fiscal and operational controls, and personnel job evaluation procedures. The section dealing with office procedures and practices pointed out areas of needed improvement in fiscal and operational controls. The personnel job evaluation study presents an objective study of the relationships of positions within the department and recommends adoption of a pay schedule geared to 'going rates' for comparable positions in the geographic region. (Author)

PB-169 518 **Field 5A, 13B, 5C**
CFSTI Prices: HC$4.00 MF$1.00
Peat, Marwick, Mitchell and Co., Chicago, Ill.
FISCAL AND OPERATIONAL CONTROL STUDY REPORT. MISSOURI STATE HIGHWAY DEPARTMENT.
Mar 65, 142p

Descriptors: (*Management control systems, Roads), (*Roads, Missouri), Data processing systems, Costs.

Identifiers: Accounting.

CONTENTS: Fiscal and operational control study and report of findings; design of accounting system; accounting and fiscal procedures; mechanized fiscal procedures; accounting organization; policies, rules, and regulations; manuals; progress meetings and research of states activities.

PB-169 519 **Field 5I, 5A, 13B**
CFSTI Prices: HC$3.00 MF$0.75
Peat, Marwick, Mitchell and Co., Chicago, Ill.
JOB EVALUATION STUDY. MISSOURI STATE HIGHWAY DEPARTMENT.
Dec 64, 73p
See also PB-169 520.

Descriptors: (*Job analysis, Roads), (*Roads, Missouri), (*Manpower studies, Roads), Personnel management, Wages.

The appendix contains comparison listings of present and recommended salary ranges, all positions included in an occupational group, and all division positions.

PB-169 520 **Field 5I, 5A, 13B**
CFSTI Prices: HC$6.00 MF$1.50
Peat, Marwick, Mitchell and Co., Chicago, Ill.
JOB EVALUATION STUDY; MISSOURI STATE HIGHWAY DEPARTMENT.
Dec 64, 278p
See also PB-169 519.

Descriptors: (*Job analysis, Roads), (*Roads, Missouri), (*Manpower studies, Roads), Personnel management, Wages.

CONTENTS: Review of Missouri State Highway Department job evaluation plans, job analysis, position descriptions, validity of position descriptions, position rating system, rating the positions, salary survey, development of recommended salary structures, recommended personnel policies, maintaining the salary structure.

PB-169 559 **Field 5B**
CFSTI Prices: HC$2.00 MF$0.50
National Federation of Science Abstracting and Indexing Services, Washington, D. C.
A NATIONAL PLAN FOR SCIENCE ABSTRACTING AND INDEXING SERVICES.
15 Mar 63, 46p
Prepared in cooperation with Robert Heller and Associates, Cleveland 14, Ohio.

Descriptors: (*Documentation, United States), (*Subject indexing, Scientific research), (*Abstracting, Scientific research), Feasibility studies, Information retrieval, Technical information centers.

The national plan proposed in this report rests on the premise that lasting improvement of the system can best be attained by building on the substantial foundation that already exists. The plan therefore proposes a high degree of cooperation among present services, a strengthened Federation, and assistance from the federal government and other organizations where required. It calls for action to: (1) Improve present publications and develop new ones. (a) Individual profession-oriented services should work directly with the National Science Foundation to make available for each field of science and technology a basic publication that meets minimum standards. (b) Profession-oriented services in addition should establish on a joint-venture basis a central operating unit to assemble and market new project-type reference materials and publications. (2) Reduce costs and increase efficiency of services in the production and marketing of secondary publications. (3) Expand the membership of the Federation and broaden the scope of its activities to make it an effective industry-wide organization for abstracting and indexing services. (Author)

PB-169 566 **Field 5C, 5D**
CFSTI Prices: HC$3.00 MF$0.75
International Customs Tariffs Bureau, Brussels (Belgium).
HUNGARIAN REPUBLIC.
4th ed., Year 1965-1966.
Dec 65, 76p
Pub. as International Customs Journal Bull-192.

Descriptors: (*Hungary, Commerce), (*Commerce, Hungary), (*Economics, International law), Law, Handbooks.

Identifiers: Customs Law.

Translation of the Customs Laws of the Hungarian Republic.

PB-169 567 **Field 5C, 5D**
CFSTI Prices: HC$4.00 MF$0.75
International Customs Tariffs Bureau, Brussels (Belgium).
FEDERAL REPUBLIC OF NIGERIA.
8th ed., Year 1965-1966.
Dec 65, 109p
Pub. as International Customs Journal Bull-134.

Descriptors: (*Nigeria, Commerce), (*Commerce, Nigeria), (*Economics, International law), Law, Handbooks.

Identifiers: Customs Law.

Translation of the Customs Laws of the Federal Republic of Nigeria.

PB-169 572 **Field 5B**
CFSTI Prices: HC$4.00 MF$1.00
Human Sciences Research, Inc., McLean, Va.
METHODOLOGY FOR TEST AND EVALUATION OF DOCUMENT RETRIEVAL SYSTEMS: A CRITICAL REVIEW AND RECOMMENDATIONS,
by Monroe B. Snyder, Anne W. Schumacher, Steven E. Mayer, and M. Dean Havron. Jan 66, 132p HSR-RR-66/6Sk
Contract NSF-C418

Descriptors: (*Information retrieval, Effectiveness), (*Test methods, Information retrieval), Documentation, Models (Simulation).

The purpose of the project was to review the test and evaluation literature on document retrieval systems, to identify the methodological problems and to develop a set of recommendations for researchers in the field. Two basic tools were developed to aid in the description and evaluation of the studies reviewed. The first tool was a descriptive model of document retrieval systems which included a representation of the functional steps from document acquisition to file and from query acquisition to file. This model was used to organize in a standard manner the content of the studies. By identifying in each of the studies the subsystem (s) and/or variables of concern and plotting them within the model, it was possible to develop a detailed picture of the content areas that have been emphasized and those that have been neglected. The second tool was the 'review framework' which consisted of fifteen research dimensions (i.e., objectives, study setting, design comparisons, etc.). The framework provided a common base for describing, analyzing and evaluating the studies. Forty-nine studies were analyzed for both methodological and content considerations. Of these 49 studies, 37 were experimental or comparative and 12 were descriptive. Eight methodological problems were identified through the evaluation procedure. Research recommendations were developed for each of these problems.

PB-169 622 **Field 5G**
CFSTI Prices: HC$2.60 MF$0.50
Warsaw Univ. (Poland).
TOWARDS A GENERAL THEORY OF SIGN SYSTEMS. I.,
by Olgierd Wojtasiewicz. 1962, 21p
Studia Logica v13 p81-101 1962. NSF Scientific Documentation Project.

Descriptors: (*Language, Theory), Set theory, Grammars, Poland, Computational linguistics, Information theory, Syntax.

Identifiers: Symbols.

The purpose of the paper is to examine what grammatical concepts, not necessarily in the traditional sense of 'grammar', can be defined on the basis

of the primitive concepts and postulates adopted. (Author)

PB-169 674 Field 5G
CFSTI Prices: HC$4.60 MF$0.50
Massachusetts Inst. of Tech., Cambridge.
THE STRUCTURE OF A SEMANTIC THEORY,
by Jerrold J. Katz and Jerry A. Fodro. 1963, 41p
Grant NSF-G-13903
Language v39 n2 p170-210 1963. Research supported in part by U. S. A. Signal Corps and AFOSR.

Descriptors: (*Semantics, Theory), English language, Linguistics, Language, Grammarrs.

At the present stage of development, semantics suffers not from a dearth of facts about meanings and meaning relations in natural languages, but rather from the lack of an adequate theory to organize, systematize, and generalize these facts. Facts about the semantics of natural languages have been contributed in abundance by many diverse fields, including philosophy, linguistics, philology, and psychology. Indeed, a compendium of such facts is readily available in any good dictionary. But at present the superabundance of facts obscures a clear view of their interrelations,while such theories as have been proposed to account for the facts have, in general, been either too loosely formulated or too weak in explanatory and descriptive power to succeed. The present paper does not attempt to present a semantic theory of a natural language, but rather to characterize the form of such a theory. A characterization of the abstract form of a semantic theory is given by a metatheory which answers such questions as these: What is the domain of a semantic theory. What are the descriptive and explanatory goals of a semantic theory. What mechanisms are employed in pursuit of these goals. What are the empirical and methodological constraints upon a semantic theory.

6. BIOLOGICAL AND MEDICAL SCIENCES

AD-265 460 Field 6H, 6R
CFSTI Prices: HC$1.10
Quartermaster Food and Container Inst. for the Armed Forces, Chicago, Ill.
FUNDAMENTAL STUDIES OF RADIATION SOURCE DOSIMETRY AND THE EFFECTS OF IONIZING RADIATION ON SUGARS.
Final rept. no. 9, 1 Apr 57-31 Mar 61,
by J. S. Andrews, D. F. Emery, G. E. Germann, andD. E. Hamerski. 1 Apr 57, 7p
Proj. 7-84-01-002

Descriptors: (*Glucose, Radiation effects), (*Radiation effects, Glucose), (*Dosimeters, Irradiated foods), Gamma rays, Ultraviolet radiation, Absorption, pH, Radiological dosage.

Certain effects of gamma radiation on glucose were studied. The pH of irradiated glucose solutions was found to vary inversely with radiation dose. It was observed that solutions prepared with irradiated dry, crystalline glucose did not absorb ultraviolet radiation, whereas irradiated aqueous glucose solutions exhibit an ultraviolet absorption maximum in the 255 to 265 millimicrons region. The position of the absorption maximum and the intensity of the absorption at the maximum were shown to be dependent on the pH of the solution. The position of the maximum is higher and the intensity is greater the more basic the solution. The yield of the ultraviolet-absorbing components, as measured by intensity of the absorption peak, appeared to be directly proportional to radiation dose and inversely proportional to initial glucose concentration. (Author)

AD-289 217 Field 6S
CFSTI Price: HC$2.00
Navy Experimental Diving Unit, Washington, D. C.
VENTILATORY DYNAMICS UNDER HYPERBARIC STATES.
Research rept.,
by William B. Wood, Lloyd H. Leve, andRobert D. Workman. 15 May 62, 30p RR-1-62

Descriptors: (*Diving, Controlled atmospheres), (*Controlled atmospheres, Pressure), (*Respiration, Diving), Oxygen equipment, Helium, Oxygen, Mixtures, Density, Toxicity.

Eleven U. S. Navy divers performed comparative dynamic pulmonary function tests under conditions of inceasing density of the respiratory media. Variations in density and viscosity were produced by having the subjects breath air and helium-oxygen mixes in alternate studies while being subjected successively to 1 through 15 atmospheres abolute pressure. Substitution of 85% helium-5% oxygen at 15 atm. abs. produced significantly less variation from normal in all parameters measured. Mean figures were 76.8% of predicted MBC, 70.9% first second TVC, and an MEF of 281 LPM. The increased work of breathing accompanying increased density of the respiratory media probably accounts for the relative decrease in RMV previously observed in underwater swimmers. High oxygen partial pressure, increased work of breathing and hypercapnia provide the ideal setting for oxygen toxicity. Helium-oxygen mixtures provide a more ideal respiratory media than nitrogen-oxygen mixtures for marked hyperbaric conditions, especially under circumstances requiring high flow rates and large respiratory minute volumes. (Author)

AD-410 471 Field 6K, 22A
CFSTI Price: HC$5.60
Naval Air Material Center, Philadelphia, Pa. Air Crew Equipment Lab.
SPACE SUIT: DETERMINATION OF THE GEOMETRY AND MINIMUM VOLUME OF THE ENVELOPE REQUIRED FOR DONNING AND DOFFING OF. GEOMETRIC AND VOLUMETRIC DETERMINATIONS OF THE MINIMAL ENVELOPE FOR DONNING THE FULL PRESSURE SUIT,
by Bertram H. Lowi and Joseph R. Provost. 1 Jul 63, 59p NAEC-ACEL-503
Task RAE-13C-005/2001/R005-01-01

Descriptors: (*Pressure suits, Space flight), (*Space flight, Pressure suits), (*Human engineering, Pressure suits), Flight clothing, Photographic analysis, Anthropometry.

Upon the request of the National Aeronautics and Space Administration (Manned Spacecraft Center), an investigation was conducted to determine the geometry and internal volume of the minimal envelope for donning the full pressure suit. Specialized techniques were evolved to achieve a systematically variable, transparent, rigid encapsulation of the subject, as well as a parallax-free method for determining the gross three-dimensional excursions of the suit/body silhouette from the nominal configuration. The precise limits of the donning geometry wee determined using photoanalysis techniques. Subsequent to the determination of donning geometry, the internal volume was systematically reduced in step-wise decrements along the spherical diameters from the seat reference point, and at each decrement, time to don was recorded. Volumetric and geometric determinations were made on 5th and 95th percentile subjects. (Author)

AD-445 002 Field 6K, 13A, 15C
CFSTI Prices: HC$7.60
MRD Div., General American Transportation Corp., Niles, Ill.
EXPERIMENTAL EVALUATION OF ENVIRONMENTAL CONTROL SYSTEMS FOR CLOSED SHELTERS,
by T. R. Charanian and J. D. Zeff. Jul 64, 74p
MRD-1242-2530
Contract OCD-PS-64-6

Descriptors: (*Shelters, Closed ecological systems), (*Closed ecological systems, Shelters), (*Ventilation, Shelters), (*Air conditioning equipment, Shelters), Civil defense systems, Underground structures, Fallout shelters.

This report summarizes results of an experimental study of 0 supply and CO2 control systems suitable for use in closed shelters for protection against fallout and/or other weapons effects. The program objectives included: (1) determination of performance characteristics and design requirements for passive CO2 absorption techniques, (2) verification of the state-of-the-art design data for dynamic CO2 absorption systems, and (3) evaluation of O commercially available regulators to determine possible design changes to provide apparatus that is more suitable for use in closed shelters. Thirty-six simulated occupany tests and one human occupancy test were conducted in order to evaluate passive CO2 absorption methods. Two canister tests were conducted to verify the design data for dynamic CO2 absorption methods. Fifteen regulator manufacturers were contracted in the field of survey effort. The program results (for a 24-hr. closure period) are as follows: (1) O supply can be provided at a cost of about $4.70 per person for smaller shelters (100-man) or about $4.15 per person in larger shelters (1000-man), and (2) CO2 concentration can be controlled satisfactorily by the use of Baralyme (or soda-lime at a slight loss in efficiency) in screened panels at a cost of about $4.50 per person. (Author)

AD-449 855 Field 6P
CFSTI Price: HC$1.60
Bolt, Beranek and Newman, Inc., Cambridge, Mass.
A STUDY OF THE ACOUSTIC REFLEX IN INFANTRYMEN,
by Michael H. L. Hecker and Karl D. Kryter.
1965, 17p
Supported in part by Army Medical Research and Development Command, Washington, D. C.

Descriptors: (*Auditory perception, Reflexes), Hearing, Motor reactions, Army personnel, Noise, Ear, Weapons, Stimulation, Audiometry.

The degree of reflex response to monaurally presented white noise (100 dB SPL) was measured and graphically recorded at the contralateral ear for 40 career infantrymen with an acoustic bridge. These soldiers had been exposed to controlled amounts of weapon noise, and pre- and post-exposure audiograms were obtained. The results show that subjects with a high pre-exposure HL are less susceptible to TTS than subjects with normal hearing. The results further indicate that a strong acoustic reflex is associated with high rather than low pre-exposure HL for subjects having no appreciable conductibe hearing impairment. Subjects with suspected middle-ear disorders exhibited no reflex response to the same stimulus. (Author)

AD-460 761 Field 6E
CFSTI Prices: HC$1.00
School of Aerospace Medicine, Brooks AFB, Tex.
NEW ELECTRONIC INSTRUMENTATION IN DENTISTRY. AN EVALUATION OF MINIATURE CARDIOVASCULAR AND PSYCHOGALVANIC SKIN RESPONSE MONITORING DEVICES.
Final rept., Nov 63-Nov 64,
by Jack L. Hartley. Dec 64, 15p SAM-TR-64-90
Task 775303
N65 30496

Descriptors: (*Dentistry, Electronic equipment), Galvanic skin response, Medical equipment, Miniature electronic equipment, Cardiovascular system, Monitors, Anxiety, Stress (Physiology), Stress (Psychology), Diagnosis, Therapy.

Identifiers: Plethysmography.

The two instruments evaluated in this clinical study of over 200 patients have been employed and found to be potential aids to the practice of dentistry, establishing better rapport and presenting considerably more information on the physiologic activity of the patient than is routinely available. These instruments did not come between the doctor and his patients; on the contrary, they assisted the doctor in gaining more empathy for the patients, which is essential to successful treatment. (Author)

AD-467 525 **Field 6S**
CFSTI Prices: HC$1.60 MF$0.50
Hofstra Coll., Hempstead, N. Y.
PHYSIOLOGICAL RESPONSES TO HIGH INTENSITY INTERMITTENT SOUND,
by Robert Plutchik. May 62, 15p
Contract Nonr-2252(01)

Descriptors: (*Sound, Stress (Physiology)), (*Stress (Physiology), Sound), Intensity, Skin, Electrocardiography, Blood pressure.

Eighteen subjects were exposed to brief periods of high intensity intermittent sound at 3 pulses per second and at levels of from 100 to 120 db. Skin temperature, Skin impedance, EKG and continuous systolic blood pressure from the finger were recorded. The results indicated little or no effect on all the measures except GSR which showed a linear increase in magnitude of response with an increase in intensity of sound. Comparisons with previous reports and some tentative explanations are presented. (Author)

AD-467 855 **Field 6L, 6R**
CFSTI Prices: HC$1.00 MF$0.50
Naval Medical Research Unit no. 2, Taipei (Taiwan).
INSTALLATION OF A WHOLE BODY COUNTER AT THE UNITED STATES NAVAL MEDICAL RESEARCH UNIT NO. 2.
Narrative summary,
by William M. Beckner. May 65, 8p

Descriptors: (*Gamma counters, Whole body irradiation), (*Medical equipment, Gamma counters), Crystal counters, Specifications, Shielding, Gamma emission, Installation, Taiwan.

AD-468 237 **Field 6E**
CFSTI Prices: HC$2.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE CLINICAL SYMPTOMATOLOGY OF CORONARY INSUFFICIENCY.
Research rept.,
by Ashton Graybiel. 15 Nov 51, 26p
NM 001-059-06-06

Descriptors: (*Cardiovascular diseases, Diagnosis), Blood circulation, Heart, Pathology, Stress (Physiology), Oxygen consumption, Electrocardiography, Athero sclerosis, Medical examination.

The report is a brief analysis of the concept of coronary insufficiency and the specific application of this concept in the case of patients with heart disease due to coronary atherosclerosis. (Author)

AD-468 313 **Field 6S**
CFSTI Prices: HC$1.00 MF$0.50
Naval School of Aviation Medicine, Pensacola, Fla.
THE RATE AND MAGNITUDE OF EXPLOSIVE DECOM- PRESSION REQUIRED TO PRODUCE LETHAL EFFECTS IN ALBINO RATS.
Research rept.,
by Arthur L. Hall. 31 Jan 57, 10p
NM 12-01-11-3

Descriptors: (*Explosive decompression, Tolerances (Physiology)), Respiratory system, High altitude, Pres sure breathing, Hemorrhage, Lungs, Pathology, Aviation medicine, Rats.

Control groups of rats were decompressed from sea level to 40,000 feet, 69,000 feet, and 105,000 feet in 0.53, 0.9, and 1.11 seconds respectively. Experimental groups of rats were explosively decompressed over the same ranges as the control groups at rates of 0.0043, 0.0068, and 0.0075 second respectively. No control rats were killed, but 40%, 70%, and 70% respectively of the experimental rats died as a result of the explosive decompression. (Author)

AD-468 593 **Field 6R**
CFSTI Prices: HC$1.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
EFFECTS OF MIXED REACTOR RADIATION ON CELL DIVISION OF SYNCHRONIZED TETRAHYMENA PYRIFORMIS,
by D. Stuart Nachtwey. 27 May 65, 17p
USNRDL-TR-865
Proj. SR-007-11-01,
Task 0549

Descriptors: (*Radiation effects, Cell division), (*Cell division, Radiation effects), (*Ciliata, Radiation effects), Neutrons, Gamma rays, Radiological dosage, Nuclear reactors, Radiobiology.

Identifiers: Tetrahymena.

The paper reports, as a portion of a continuing study, the effects of mixed, neutron-gamma, reactor radiation on cell division of synchronized Tetrahymena pyriformis, a ciliate protozoon. These effects of reactor radiation are compared with the effects of 250 kvp X-radiation in the range 0-100 krads. Reactor radiation delays cell division more efficiently than does X-radiation; the relative potency is 1.3. The dosage response curve is biphasic in both neutron-gamma-irradiated and X-irradiated cells. In the range 0 to 16-20 krads, the division delays appear to follow a saturation-type curve. Above these values, the division delays appear to be linearly related to dose. (Author)

AD-468 695 **Field 6R, 6A**
CFSTI Prices: HC$1.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
MOUSE THYMOCYTE BETA-GLUCURONIDASE ACTIVITY AFTER WHOLE-BODY X-IRRADIATION,
by Leonard J. Greenberg and Leonard J. Cole. 25 Jun 65, 17p USNRDL-TR-872
NAVMED MR005.8-1200-2

Descriptors: (*Radiation effects, Enzymes), (*Enzymes, Radiation effects), X-rays, Whole body irradiation, Thymus, Cells (Biology), Radiation injuries, Fluorometers, Sublethal dosage, Mice.

Beta-glucuronidase activity of mouse thymocytes, at various time intervals after a single whole-body sublethal dose of X-rays (600 rad), was studied. Activity per cell showed an initial peak at day 2, a maximum by day 7 and returned to normal levels by day 11. Concomitant cell volume distribution analyses were carried out; the data were interpreted to indicate a positive correlation of changes in B-glucuronidase activity with changes in the medium and large thymocyte populations. (Author)

AD-468 696 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
THE EFFECT OF X-RAYS ON THE ACTIVITY OF NEURONS IN THE RAT OLFACTORY BULB,
by Gary P. Cooper and Donald J. Kimeldorf. 6 Jul 65, 29p USNRDL-TR-875
NAVMED MR005.08-5200-4

Descriptors: (*Radiation effects, Nerve cells), (*Nose, Radiation effects), X-rays, Sense organs, Paranasal sinuses, Dose rate, Radiological dosage, Nerve impulses, Radiobiology, Rats.

Identifiers: Olfactory bulbs.

Extracellular microelectrode recordings were made from single neurons of the olfactory bu.b in anesthetized rats. Approximately 15 percent of the units examined responded in some way (usually an increase in frequency) to 250 kvp x-irradiation at dose rates of 1.5 to 2.0 R/second when exposures of the whole animal, head only, or olfactory bulb region were made. No responses to radiation were obtained when exposures were made of the body only, the head posterior to the olfactory bulb, or the anterior 5-8 mm of the head. Ethyl alcohol perfused through the nasal cavities of tracheotomized rats abolished all responses to radiation. After perfusion of normal saline through the nasal passages responses of units to radiation were readily obtained. In units which were studied both before and after perfusion of salihe through the nasal passages, the response to radiation was usually abolished temporarily. It was concluded that x-irradiation can in some way stimulate olfactory receptors. (Author)

AD-468 979 **Field 6R**
CFSTI Prices: HC$2.00 MF$0.50
Naval Radiological Defense Lab., San Francisco, Calif.
AGE AND DOSE DEPENDENCE OF BONE GROWTH RETARDATION INDUCED BY X IRRADIATION,
by Richard D. Phillips and Donald J. Kimeldorf. 1 Jul 65, 28p USNRDL-TR-873
NAVMED MR005.08-5201-2

Descriptors: (*Radiation effects, Bone), (*Bone, Radiation effects), Aging (Physiology), Growth, X-rays, Radiological dosage, Mathematical analysis, Radiobiology, Inhibition, Radiation injuries, Rats.

The quantitative aspects of bone growth retardation in rats after x-irradiation were determined with respect to radiation dose and exposure age. The deficits in femur and tibia growth at 60 days after irradiation increased exponentially with a linear increase in dose. The growth deficits were also a function of exposure age, increasing exponentially with the reciprocal of exposure age. The information obtained from the dose-response and age-response relationships was used to derive an equation which could be used to predict the bone growth decrement on the basis of the age at exposure and the dose administered. The general equation for bone growth retardation was found to give a good estimation of effect within the dose range of 100 to 680 rads for exposure ages of 24 to 58 days. (Author)

AD-475 558 **Field 6E**
CFSTI Prices: HC$1.00 MF$0.50
Duke Univ., Durham N. C. Medical Center.
EMPLOYMENT OF CROSS CIRCULATION AND MULTIPLE HEAT EXCHANGERS TO INDUCE DEEP HYPOTHERMIA: ITS USE IN THE STUDY OF CENTRAL NERVOUS SYSTEM CHANGES.
Interim rept. Sep 63-Sep 64,
by Alan M. Lesage, James M. Lee, Anna D. Ottolenghi, Glenn W. Young Jr., and Will C. Sealy. Sep 65, 19p
Contract AF 41(657)-312,
Proj. AF-8240,
Task 824024
AAL TR-64-37

Descriptors: (*Hypothermia, Blood circulation), (*Blood circulation, Central nervous system), (*Central nervous system, Blood circulation), Blood transfusions, Heart, Mechanical organs, Brain, Spinal cord, Peripheral ner-

vous system, Tolerances (Physiology), Heat exchangers, Pathology, Dogs.

Identifiers: Extracorporeal circulation.

The studies have excluded the role of silicone and oxygen bubbles in the genesis of brain and spinal cord damage. The studies confirm the fact that 60 min of circulatory standstill is the upper limit of the tolerable ischemia even at temperatures below 10C. Spinal cord changes noted in the cross-circulation group were similar to those noted in the bubble oxygenator group. The role of ischemia and hypothermia in the genesis of this lesion is not known. It is thought that the lesion is most likely in the cord, but the possibility of its being in the peripheral nerves has not been excluded. (Author)

AD-475 559 **Field 6S, 6P, 6F**
CFSTI Prices: HC$1.00 MF$0.50
Hawaii Univ., Honolulu. Pacific Biomedical Research Center.
STUDIES ON THE ENERGY COST OF LEVEL CROSS-COUNTRY TRAVEL IN THE ARCTIC.
Interim technical rept. for 15 Feb-15 Mar 64,
by T. A. Rogers, A. C. Buck and J. C. Klopping.
Oct 65, 11p
Contract AF41 (609)-1918,
Proj. AF-8238,
Task 823803
AAL TR-65-9

Descriptors: (*Oxygen consumption, Arctic regions), (*Exercise, Energy), Motion, Snow, Snowshoes, Velocity, Skis, Transportation, Stress (Physiology).

The Wolff Integrating Motor Pneumotachograph was utilized to determine oxygen consumption of men traveling on foot, on snowshoes or on skis. As expected, the energy cost of walking in unbroken snow was greater than that of any other activity studied. The advantage of wearing snowshoes in deep snow varied greatly, evidently according to the skill of the wearer. The authors concluded that when the subject is wearing skis, the most efficient speed for covering a long distance is best determined by the subject himself, since caloric cost is approximatey independent of speed within a reasonable range of speeds. (Author)

AD-475 560 **Field 6T, 6Q**
CFSTI Prices: HC$2.00 MF$0.50
Hine Labs., Inc., San Francisco, Calif.
RESEARCH ON THE INFLUENCE OF VARIATIONS IN ENVIRONMENTAL TEMPERATURES ON THE SYSTEMIC EFFECTS OF ALCOHOL ALONE AND IN COMBINATION WITH OTHER DRUGS.
Final rept. 1 Jun 63-31 May 64,
by M. L. Dewey and S. E. C. Leung. Oct 65, 41p
Contract AF 41 (609)-1590,
Proj. AF-8241,
Task 824102
AAL TR-65-2

Descriptors: (*Alcohols, Temperature), (*Toxicity, Alcohols), Ethanols, Environment, Exposure, Body temperature, Equilibrium, Drugs, Chlorpromazine, Metabolism, Sleep, Barbiturates.

The acute toxicity of ethyl alcohol was doubled by 24 hours exposure to 0-5C, immediately prior to administration of the test. Rates of alcohol metabolism were not significantly altered by either acute or prolonged cold exposure, though body temperatures were altered significantly. When animals were habituated by receiving an aqueous solution of alcohol as their only source of fluid intake, equilibrium was impaired to a greater extent in some cold-exposed groups, the total increase in body weight per unit of time was depressed, the absorption rate was greater and oxidation rate slower than in groups habituated at room temperature. While the blood pentobarbital concentration was increased in animals exposed to cold for long periods, cold alone had no effect on the sleeping time induced by pentobarbital, and affected the increased sleeping time resulting from the simultaneous administration of alcohol and pentobarbital only when the two drugs were given within a short interval and the dose of alcohol was low. Chlorpromazine had a bivalent effect on body temperature, raising the temperature in animals exposed to cold and lowering the temperature in animals maintained at room temperature or when given to cold exposed animals in combination with alcohol. Cold had a brief effect on the impairment produced by alcohol and chlorpromazine together.

AD-475 561 **Field 6P**
CFSTI Prices: HC$1.00 MF$0.50
Kentucky Univ., Lexington. Dept. of Physiology and Biophysics.
PRECOOLING OF PERIPHERAL ARTERIAL BLOOD IN COLD- AND WARM-ADAPTED RABBITS.
Interim rept. Jan 64-Jan 65,
by Nishio Honda. Oct 65, 14p
Contract AF 41 (609)-2193,
Proj. AF-8237
Task 823702
AAL TR-65-3

Descriptors: (*Blood, Cooling), (*Body temperature, Control), Arteries, Acclimatization, Rabbits, Environ ment, Adaptation (Physiology).

The role of precooling of peripheral arterial blood in temperature regulation was studied in cold-adapted and warm-adapted rabbits. It was found that precooling of arterial blood during its flow from the interior to the surface (ear) of the body in a cold environment is more marked in the cold-adapted rabbits than in warm-adapted rabbits. In a warm environment no difference was found between the two groups. (Author)

N66-15071 **Field 6F**
CFSTI Prices: HC$1.00 MF$0.50
IIT Research Inst., Chicago, Ill.
LIFE IN EXTRATERRESTRIAL ENVIRONMENTS.
Quarterly status rept., 15 Aug - 15 Nov 65,
by C. A. Hagen. 1965, 17p IITRI-L6023-3
Contract NASR-22
NASA CR-69141

Descriptors: (*Bacteria, Space biology).

Patent 3,228,771 **Field 6H**
PROCESSING OF WHEAT AND PRODUCT PRODUCED THEREFROM.
Patent assigned to Agriculture,
by Michael J. Copley, Robert E. Ferrel, and James W.Pence. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Wheat, Processing), Patents.

Wheat is converted into a product which resembles rice. The food product is in the form of unbroken grains with at least the outermost bran layer removed but retaining the innermost bran layer and with at least 30 percent of the germ removed. The grains are in an expanded porous state. The product is adapted for use in India and the Far East.

Patent 3,228,773 **Field 6H**
METHODS FOR PRODUCING TEMPEH.
Patent assigned to Agriculture,
by Clifford W. Hesseltine and Alcides Martinelli, Jr. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Vegetables, Preparation), Processing, Indonesia.

Identifiers: Soybeans.

Tempeh, a fermented soybean preparation, is used as a food product in Indonesia. A highly edible and nutritious tempeh is prepared by inoculating a cooked, hydrated, and swollen medium such as drained dehulled soybean halves and drained soybean grits with an aqueous wash suspension of Rhizopus spores. This product is packed into perforated plastic bags and incubated at from 25 to 37 degrees C. for 22 hours.

Patent 3,228,855 **Field 6A**
PROCESS FOR A MICROBIAL POLYSACCHARIDE.
Patent assigned to Agriculture,
by Martin C. Cadmus and Ralph F. Anderson. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Polysaccharides, Processing), Microorganisms, Uronic acids, Polymers, Additives, Patents.

The product is useful as a thickening agent broadly, and as an additive for oil well drilling fluids and foodstuffs. The polysaccharide consists of glucose, galactose, mannuronic acid and O-acetyl moieties. The gum polymer is produced by fermenting members of a novel species of diptheroidic bacterium which belong to the genus Arthrobacter.

PB-169 104 **Field 6C, 11L**
CFSTI Prices: HC$1.00 MF$0.50
Forest Products Lab., Madison, Wis.
DETERMINING RESISTANCE TO SOFT-ROT FUNGI.
Research paper,
by C. G. Duncan. Dec 65, 15p FPL-48

Descriptors: (*Wood, Fungus deterioration), (*Fungus deterioration, Resistance (Biological)), Fungi, Degrada tion, Soils, Culture media, Test methods, Fungusproofing.

A laboratory procedure is outlined that incorporates techniques found to promote soft rot by several fungi. This procedure employs either an agar or a soil substrate. Also presented are the principal findings of experiments underlying the procedure. Results of tests conducted according to the suggested procedure are illustrated. The overall decay resistance of the softwoods typically was greater than that of hardwoods. The levels of decay in softwoods, however, were substantially higher than previously obtained. There was a tendency for decay in soil to be somewhat greater than on agar; however, a particular preference for either substrate was indicated only in a few instances. (Author)

PB-169 438 **Field 6H, 5J, 5E**
CFSTI Price: HC$2.60
Quartermaster Food and Container Inst. for the Armed Forces, Chicago, Ill.
FOOD ATTITUDES IN AN UNUSUAL ENVIRONMENT.
Interim rept.,
by David R. Peryam. Sep 60, 27p QMFCIAF-32-60
AD 246 802

Descriptors: (*Attitudes, Military personnel), (*Food, Acceptability), (*Polar regions, Food), Greenland, Armed forces supplies, Logistics, Human engineering.

An exploratory interview study of food-related attitudes was conducted among a sample of enlisted men stationed at Camp Fistclench, Greenland, during the summer of 1959. Strongly favorable attitudes toward food and other aspects of the feeding situation were found. Interview questions covering a range of topics showed little or no psychological stress. Possible interpretations of the results are discussed. (Author)

7. CHEMISTRY

AD-419 212 **Field 7E, 11G**
CFSTI Price: HC$4.60
American Cyanamid Co., Stamford, Conn. Central Research Div.
CHEMILUMINESCENT MATERIALS.
Technical rept. no. 1, 1 Jun-31 Aug 63.
31 Aug 63, 44p
Contract Nonr-4200 (00), ARPA Order-299, Proj. NR-356-452

Descriptors: (*Chemiluminescence, Materials), Radiometers, Fluorescence, N-heterocyclic compounds, Ketones, Peroxides, Anhydrides, Phosphines, Hydrizine derivatives, Polymers, Halogenated hydrocarbons, Oxychlorides, Hydrogen peroxide, Emissivity.

Identifiers: Luminol, Methyl acridones, Oxalyl chloride.

Apparatus intended for quantitative measurement of chemiluminescence as a function of time, temperature and wavelength was assembled and calibration is virtually complete. Three syntheses are under investigation involving preparation of energy rich precursors which should collapse on heating or reaction to give the known fluorescing agent N-methylacridone, or a derivative. These reactions resemble processes which may occur in the known lucigenin chemiluminescence. Routes to a cyclic diacyl peroxide which can collapse to a fluorescent cyclic anhydride on reaction with a phosphine are described. Preparation of a key intermediate for the synthesis of a highly fluorescent or, alternatively, a polymeric derivative of luminol (aminophthalhydrazide) is described. A literature report that oxalyl chloride and hydrogen peroxide liberate light only in the presence of an energy acceptor was confirmed and amplified. The system is important since it demonstrates light emission proceding from structurally simple reactants and indicates that many well known reactions might be chemiluminescent if proper methods for transferring energy could be established. (Author)

AD-431 334 **Field 7D, 4A**
CFSTI Prices: HC$8.60
TEMPO, General Electric Co., Santa Barbara, Calif.
REACTION RATE COEFFICIENTS FOR AMBIENT AND HEATED AIR,
by Douglas H. Archer. 1 Nov 63, 81p Rept. no. RM63TMP-45
Contracts DA-49-146-XZ-038, AF 19 (628)-207 DASA 1437

Descriptors: (*Air, Reaction kinetics), (*Gas ionization, Air), High-temperature research, Dissociation, Recombination reactions, Neutralization, Photochemistry.

Current estimates of the principal reaction rate coefficients involved in ionization studies at both ambient and elevated temperatures are collected and some indication of the uncertainties given. Graphs are presented showing the variation of the various coefficients with height and temperature, etc. Included in the report are results giving the photo-detachment rate due to radiation from hot air over the temperature range from 3000 to 9000K and over the density ratio range from 1 degree to 0.000001. (Author)

AD-437 157 **Field 7D, 9A**
CFSTI Prices: HC$3.60 MF$0.75
TRACOR, Inc., Austin, Tex.
STUDY OF THE OXYGEN ELECTRODE MECHANISM.
Rept. no. 4 (Final), 1 Jan 62-31 Dec 63,
by Ray M. Hurd. 13 Mar 64, 40p TRACOR-64-138-U
Contract DA-36-039-sc-89159, ARPA Order-247-61
See also AD-415 090.

Descriptors: (*Oxygen, Electrodes), (*Electrodes, Oxygen), Reaction kinetics, Electrochemistry, Acids, Electrolytes, Transport properties, Gas flow.

The processes involved in transporting oxygen from a gas feed stream to reaction sites at the electrode/electrolyte interface are examined. Transfer across the gas/liquid interface and through the bulk solution are well understood, and sufficient data for gas diffusion electrode design are available. A method to study surface migration process is outlined, using double layer capacity measurements to monitor the presence of adsorbed oxygen as a function of time on electrodes of varying geometries. The dependence of the double layer capacity of platinum in acid and alkaline electrolytes on a variety of parameters is explored. A reduced platinum surface is insensitive to oxygen adsorption, but a thin conducting layer of an oxide, which can be formed by a number of oxidizing pretreatments, interacts strongly with dissolved oxygen. The proposed method of examining surface migration cannot be applied to a reduced platinum surface, it is still valid for migration along a conducting oxide. (Author)

AD-442 413 **Field 7D, 9A**
CFSTI Price: HC$8.60
Westinghouse Electric Corp., Pittsburgh, Pa.
A STUDY OF THE ADSORPTION MECHANISMS ON OXYGEN ELECTRODES.
Final rept. no. 4, 6 Sep 62-5 Mar 64,
by Y. L. Sandler and S. Z. Beer. 5 Mar 64, 87p
Contract DA-36-039-AMC-00136 (E), ARPA Order-226
N64 27612

Descriptors: (*Anodes (Electrolytic Cell), Adsorption), (*Exchange reactions, Electrolysis), (*Electrodes, Oxygen), (*Oxygen, Electrodes), Silver, Silver alloys, Gold alloys, Palladium, Platinum, Chemisorption, Electrochemistry, Isotopes.

Different types of oxygen chemisorption were found on silver and their properties were investigated. Other materials studied were silver-gold alloys, palladium and platinum. Pressure-temperature scans, various types of isotopic exchange reactions, measurements of desorption rates and the magnetic ortho-para conversion of hydrogen were used to obtain information on the modes of adsorption. At least two types of oxygen chemisorption, differing considerably in binding energy and presumably in their coordination with silver atoms, contribute to the exchange reaction between 016 and 018 above 160 C, but only the weaker chemisorption is directly involved in the adsorption-desorption process. Some firmly bound oxygen is located below the surface. The rate of desorption is affected by high-temperature pretreatment with oxygen. Hydrogen pretreatment at high temperatures produces very firmly bound hydroxyl groups which change the activation energy of the desorption process. (Author)

AD-462 335 **Field 7D, 20D, 9B, 20M**
CFSTI Price: HC$8.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
A FORTRAN COMPUTER PROGRAM FOR THE SOLUTION OF MULTI-DIMENSIONAL, TRANSIENT, ABLATION PROBLEMS.
Technical memo.,
by R. W. Allen and R. P. Suess. Feb 65, 85p
TG-648
Contract NOw-62-0604-c

Descriptors: (*Ablation, Programming (Computers)), Aerodynamic heating, Thermal conductivity, Temperature, Boundary layer, Thickness, Instruction manuals, Equations, Tables, Graphics, Digital computers.

Identifiers: FORTRAN.

A flexible FORTRAN computer program to determine the temperature history and ablation history of aerodynamically heated flight bodies has been devised. The effect on heat conduction and aerodynamic heating histories of the removal of ablating wall materials is automatically accounted for by the computer program. The program is flexible in that it can accommodate flight body heat conduction inputs in the form of any reasonable combination of geometry and construction materials. The program will accept only one ablative material at any single position on the flight body surface but different ablative materials can be specified for different locations. One section of the program receives flight trajectory, radiation-property, and local aerodynamic flow inputs and provides for the computation of local aerodynamic heating and radiation relief. The other section of the program governs the computation of temperature history throughout the flight body and the thickness history of ablating layers. There is no provision for readjusting vehicle aerodynamics in accordance with body-shape changes. (Author)

AD-466 629 **Field 7D, 1A**
CFSTI Prices: HC$3.00 MF$0.75
Heliodyne Corp., Los Angeles, Calif.
MOMENTUM TRANSFER APPROXIMATION FOR THE CALCULATION OF MOLECULAR TRANSITION PROBABILITIES IN HIGH TEMPERATURE GAS KINETIC COLLISIONS,
by Andrew P. Proudian. Jun 65, 67p Research note-22
Contract DA-04-495-AMC-458 (Z), ARPA Order-360

Descriptors: (*Molecular properties, Momentum), (*Diatomic molecules, Kinetic theory), (*Polyatomic molecules, Kinetic theory), (*Kinetic theory, Momentum), Transport properties, Probability, Chemical bonds, Excitation, Rotation, Vibration, Oxygen, Argon, High -temperature research, Shock waves, Dissociation, Atmospheric entry.

Identifiers: Defender project, Particle interactions.

A straightforward method, the momentum transfer approximation, is proposed for the determination of the probabilities of inelastic (non-electronic) processes in high temperature gas kinetic collisions. The approximation is applicable to polyatomic as well as diatomic molecules. It permits the computation of simultaneous rotation-vibration transitions, as well as dissociative transitions for any intermolecular interaction potential, and therefore, has wider applicability than most existing quasi-impulsive collision models. The momentum transfer approximation is applied in the present paper to preliminary computations of vibrational transition probabilities in oxygen collisions with argon, for temperatures ranging from 400K to 22,000K. The results indicate that multiple quantum jumps are strongly allowed, as expected. The present results are too limited to permit useful comparisons with experiment, or analyses of relaxation of the internal degrees of freedom of shocked gases. They do predict, however, a shortened incubation time for dissociation, and indicates that the Landau-Teller ladder climbing restriction applied to many dissociation studies will lead to erroneous results. (Author)

AD-468 061 **Field 7D, 1A, 4A**
CFSTI Prices: HC$3.00 MF$0.50
Avco-Everett Research Lab., Everett, Mass.
AIR RADIATION GRAPHS: SPECTRALLY INTEGRATED FLUXES INCLUDING LINE CONTRIBUTIONS AND SELF ABSORPTION,
by R. A. Allen. Jul 65, 54p Research note-561
Contracts DA-01-021-AMC-12005 (Z), NASw-748

Descriptors: (*Air, Continuous spectrum), (*Thermal radiation, Air), (*Atmospheric heating, Thermal radiation), (*Continuous spectrum, Air), Diatomic molecules, Nitrogen compounds, Dioxides, Band spectrum, Ions, Line spectrum, Absorption, Reentry vehicles, Graphics.

Identifiers: Defender project, Nitrogen oxides.

Calculations were made of the equilibrium radiation emitted from air over a range of temperatures from 2,000K to 23,000K and over a density range from 0.000001 to 10 atmospheres. The calculations are presented in graphical form and are in terms of the radiation flux emitted from one side of infinite slabs of finite thickness. The molecular band systems were calculated using a smeared rotational model, and are carried out for a slab thickness of 1 cm. Atomic line and free-bound transitions are important contributors at elevated temperatures and also generally undergo significant amounts of self-absorption. Consequently calculations for these two classes of radiation were made with slab thickness as an added parameter. The lines, free-bound and free-free radiation were also split into the two spectral regions for the radiation flux above and below 2000A. (Author)

AD-468 062 **Field 7D, 4A**
CFSTI Prices: HC$2.60 MF$0.50
Avco-Everett Research Lab., Everett, Mass.
SPIN-ORBIT COUPLING AND ELECTRON AFFINITY DETERMINATION FROM RADIATIVE CAPTURE OF ELECTRONS BY OXYGEN ATOMS.
Research rept.,
by R. Stephen Berry, John C. Mackie, Raymond L. Taylor, and Robert Lynch. Jul 65, 30p RR-216
Contracts DA-01-021-AMC-12005 (Z), AF 29 (601)-6488,
Proj. AF-7811
N65 33729

Descriptors: (*Oxygen, Electron capture), (*Electron capture, Oxygen), Continuous spectrum, Luminescence, Shock waves, Vapors, Potassium compounds, Peroxides, Rubidium compounds, Oxides, Neon, Argon, Nuclear spins, Atomic orbitals, Electron transitions, Atmosphere entry.

Identifiers: Defender project, Potassium peroxide, Rubidium oxide.

The radiation continuum from the electron capture process O (0) + e to O (-) + photon is studied in the region of the threshold, 7800-8000 A. The spectrum is produced in shock-heated vapors of potassium peroxide and rubidium oxide in neon and argon. Individual thresholds are resolved which corresponds to the transitions O (triplet-P2) to O (-) doublet-P1/2), O (triplet-P2) to (doublet-P3/2), O (triplet-P1) to O (-) (doublet-P3/2) and possibly O (triplet-P0) to O (-) (doublet-P1/2). From these threshold measurements, the electron affinity of the oxygen atom is determined to be 1.478 plus or minus 0.002 eV and the separation of doublet-P1/2, doublet-P3/2 states of O (-) is 285 plus or minus 15/cm, corresponding to a spin-orbit coupling constant of 190 plus or minus 10/cm for the oxygen negative atomic ion. (Author)

N66-13373 **Field 7D**
CFSTI Prices: HC$2.00 MF$0.50
National Bureau of Standards, Washington, D. C.
A SURVEY OF THERMODYNAMIC PROPERTIES OF THE COMPOUNDS OF THE ELEMENTS.
Preliminary rept., 1 Jul-30 Sep 65,
by G. T. Armstrong, M. K. Buresh, G. T. Furukawa, and M. L. Reilly. 1 Oct 65, 30p NBS-8992
Contract NASA Order R-138
NASA CR-68618

Descriptors: (*Ammonia, Thermodynamics), (*Carbon dioxide, Thermodynamics), (*Water, Thermodynamics).

N66-13497 **Field 7E**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
CROSS-LINKING OF POLYVINYLIDENE FLUORIDE BY GAMMA RADIATION,
by G. F. Pezdirtz and G. D. Sands. 1965, 6p
NASA-TM-X-57037
Prepared for presentation at Natl. Meeting of Am-Chem-Soc. (150th). Atlantic City, 12-17 Sep 65.

Descriptors: (*Fluorides, Molecular structure), Gamma rays.

Identifiers: Polyvinylidene fluoride.

N66-14969 **Field 7C**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Huntsville, Ala. George C. Marshall Space Flight Center.
CHEMICAL SYNTHESIS OF MONOMERIC SELF-SEALANT TYPE ESTERS.
Status rept.,
by L. R. Moffett, Jr. 4 Nov 65, 29p
NASA TM-X-53358

Descriptors: (*Esters, Synthesis (Chemistry)).

Identifiers: Alkyl esters, Alpha-Cyanosorbic acid.

N66-15065 **Field 7D**
CFSTI Prices: HC$1.00 MF$0.50
Aeronutronic, Div. Philco Corp., Newport Beach, Calif.
STUDY OF BASIC BIO-ELECTROCHEMISTRY.
Monthly progress rept. no. 6, 1-31 Aug 63,
by R. C. Bean, M. H. Boyer, and T. H. Inami. 1963, 11p MPR-63-120
Contract NASw-655
NASA CR-69138

Descriptors: (*Hydrogen peroxide, Chemical reactions), (*Electrodes, Catalysts).

Identifiers: Bioelectrochemistry.

NBS-TN-272 **Field 7D, 14B**
CFSTI Prices: HC$0.50 MF$0.75
National Bureau of Standards, Washington, D. C. Inst. for Materials Research.
SPECTROCHEMICAL ANALYSIS: OPTICAL SPECTROMETRY, X-RAY FLUORESCENCE SPECTROMETRY, AND ELECTRON PROBE MICROANALYSIS TECHNIQUES, JUNE 1964 TO JUNE 1965,
by Bourdon F. Scribner. 21 Oct 65, 86p
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.50, as C13.46:272.

Descriptors: (*Spectroscopy, Reviews), (*X-ray spectroscopy, Reviews), (*Electron beams, Reviews), (*Microanalysis, Reviews), Fluorescence, Electric arcs, Sparks, Plasma medium, Controlled atmospheres, Lasers, Atomic spectroscopy, Spectrum analyzers, Probes (Electromagnetic), Metals, Purification, Standards.

A summary is given of the activities of the Spectrochemical Analysis Section for the period from July, 1964 through June, 1965. Activities in optical spectrometry included studies of excitation by arcs and sparks in controlled atmospheres and by the laser probe, the measurement of arc temperatures, and atomic absorption spectrometry. In x-ray spectrometry, methods were developed for the analysis of copper alloys in solution, as well as silver-base, and gold-base dental alloys. An electron probe micro-analyzer was installed, and a description is given of the modifications that have been made to the instrument, the plans for future investigations, and some applications. Chemical and physical enrichment methods were developed for the analysis of high-purity tin, zinc, and platinum. Homogeneity tests and analyses were performed in the development of standard reference materials. Other activities included analyses of samples to assist other NBS groups and government agencies, and literature surveys. Listings are given of 20 publications and 14 talks by members of the Section within the year. (Author)

ORNL-3879 **Field 7A, 11F**
CFSTI Prices: HC$2.00 MF$0.50
Oak Ridge National Lab., Tenn.
LABORATORY PREPARATION OF URANIUM NITRIDE MICROSPHERES BY A SOL-GEL TECHNIQUE,
by T. A. Gens, D. M. Helton, and S. D. Clinton. Nov 65, 26p
Contract W-7405-eng-26

Descriptors: (*Uranium compounds, Nitrides), Gels.

Patent 3,228,980 **Field 7C**
PREPARATION OF ALKANESULFONATES.
Patent assigned to Agriculture,
by James K. Weil, Alexander J. Stirton, Frank D. Smith and Raymond G. Bistline, Jr. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Alkanes, Sulfonates), Preparation, Synthesis (Chemistry), Surface-active substances, Patents.

The alkanesulfonates and associated products are useful as chemical intermediates, surface active agents, detergents, and components of detergent compositions. They are prepared by combining sodium hydroxide with an alpha-sulfo-carboxylic acid to give an alkaline mixture, stirring the mixture and heating it under a nitrogen atmosphere to the fusion temperature to form an alkanesulfonate.

Patent 3,234,562 **Field 7B**
ALKALI METAL BOROHYDRIDE AND BORON HALIDE DETERMINATION PROCESS.
Patent assigned to Air Force,
by Gordon W. Bell and Grady C. Carroll. 8 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Boron compounds, Chemical analysis), Patents, Alkali metal compounds, Halides, Hydrides, Borohydrides, Determination.

Identifiers: Boron halide.

The method is for measuring the concentration of an alkali metal borohydride or a boron halide in a diethyl ether solution. A silver electrode and an antimony electrode are introduced into the solution thereby generating an electromotive force. The direction of the E.M.F. depends upon the concentration of the material in the solution.

PB-169 235 **Field 7B, 11B**
CFSTI Prices: HC$3.00 MF$0.75
Commissariat a l'Energie Atomique, Saclay (France). Centre d'Etudes Nucleaires.
ETUDE DE L'EAU DE CONSTITUTION DE PLUSIEURS OXYDES A GRANDE SURFACE SPECIFIQUE (GLUCINE, ALUMINE, SILICE-ALUMINE) (STUDY ON THE BOUND WATER OF SEVERAL HIGH SPECIFIC SURFACE-AREA OXIDES (BERYLLIA, ALUMINA, SILICA-ALUMINA)).
Doctoral thesis in French,
by Jean Rouquerol. 1965, 60p CEA-R-2703
Text in French; Attached Summary in English.

Descriptors: (*Ceramic materials, Hydrates), (*Hydrates, Chemical analysis), (*Oxides, Dehydration), Aluminum compounds, Beryllium compounds, Silicon compounds, Thermal analysis, Adsorption, Nitrogen, Hydrolysis, Diboranes, Infrared spectroscopy, Nuclear magnetic resonance, Hydroxides.

Identifiers: Aluminum oxides, Beryllium oxides, Silicon dioxide.

The study was concerned with the bound water of several oxides (beryllia, alumina, silica-alumina) at different steps of their dehydration (heating temperatures between 150 and 1100C). The following techniques were used simultaneously: thermal analysis (a new method developed); nitrogen adsorption (study of the texture); diborane hydrolysis (qualitative and quantitative analysis of surface water); infra-red spectrography (in the absorption range of water); nuclear magnetic resonance (in the resonance range of protons). Due to these different techniques, five kinds of bound water were observed. Attention is called to the great influence of the thermal treatment conditions on the evolution of the products resulting from the decomposition of alumina alphatrihydrate Al (OH)3 and beryllium alpha-hydroxyde, in the course of the dehydration. (Author)

PB-169 364 **Field 7C, 5B**
CFSTI Prices: HC$5.60 MF$0.50
Wiswesser (William J.), Reading, Pa.
A DECODING STUDY OF THE LINE-FORMULA CHEMICAL NOTATION.
Final rept.,
by William J. Wiswesser. Dec 65, 51p
Grant NSF-G15598

Descriptors: (*Molecular structure, Coding), (*Chemical compounds, Coding), (*Decoding, Molecular structure), Performance tests, Organic compounds.

Identifiers: Chemical notation systems.

Results are reported of a study designed to determine the ease and accuracy of decoding from Wiswesser line-formula notation to conventional structural diagrams, and to identify difficulties encountered in using the system. The tests complement a previous encoding study (see PB-171 123, USGRR v35 p123, 13 Jan 61). In general, the results of some 2600 tests (completed by students, teachers, and practicing chemists) showed no major difficulties except with notations for bridged, sprio, and perifused systems.

SC-RR-65-629 **Field 7B**
CFSTI Prices: HC$1.00 MF$0.50
Sandia Corp., Albuquerque, N. Mex.
A KINETIC STUDY OF THE CHANGE IN THE ABSORPTION SPECTRUM OF URANIUM (IV) SOLUTIONS, WITH TIME, AT LOW ACIDITES,
by J. O. Wear. Dec 65, 13p
Contract AT (29-1)-789

Descriptors: (*Uranium, Absorption spectrum), (*Solutions, Reaction kinetics).

8. EARTH SCIENCES AND OCEANOGRAPHY

AD-418 468 **Field 8K**
CFSTI Price: HC$11.60
United ElectroDynamics, Inc., Pasadena, Calif.
IDENTIFICATION AND ELIMINATION OF MICROSEISM NOISE AT DEPTH USING THEORETICAL RAYLEIGH WAVE AND OBSERVED NOISE DISPLACEMENT.
Final rept., suppl.,
by Charles Archambeau, Shelton S. Alexander, andElaine E. Biehler. 10 Apr 63, 118p Rept. no. T/1129-21
Contract AF 33 (600)-42890,
Proj. T/1129/S/AMC

Descriptors: (*Microseisms, Fourier analysis), (*Seismology, Microseisms), Noise, Identification, Seismometers.

AD-467 176 **Field 8L, 8J, 20A**
CFSTI Prices: HC$6.60 MF$0.75
Lamont Geological Observatory, Palisades, N. Y.
NATURAL AND MAN-MADE ICE VIBRATIONS IN THE CENTRAL ARCTIC OCEAN IN THE FREQUENCY RANGE FROM 0.1 TO 100 CPS.
Technical rept.,
by David Prentiss, Edward Davis and Henry Kutschale. Jun 65, 61p CU-4-65, TR-4
Contract Nonr-266 (82)

Descriptors: (*Ice islands, Vibration), (*Underwater sound, Ice islands), Arctic Ocean, Ice, Acoustics, Ex tremely low frequency, Marine geophysics.

During April and May, 1962, ice vibrations in the frequency range from 0.1 to 100 cps were measured aboard drifting ice island ARLIS II in the central Arctic Ocean. A vertical-component seismometer, which was anchored to the surface of the island, was employed as a detector. Typical displacement spectra show the following characteristics: (1) a nearly constant decrease in amplitude with increasing frequency from 2.4 x 10,000 millimicron at 0.1 cps to 1.0 millimicron at 6 cps; (2) an amplitude minimum of 0.1 millimicron between 6 and 10 cps; (3) an amplitude peak of 2 millimicron between 30 and 70 cps. (Author)

PB-169 484 **Field 8H**
CFSTI Prices: HC$4.00 MF$0.75
Geological Survey, Austin. Water Resources Div.
FLOODS ON SMALL STREAMS IN TEXAS.
Progress rept.,
by Frederick H. Ruggles, Jr. Jan 66, 113p Research rept. no. 85-1
Proj. 4-5-65-85
Prepared in cooperation with the Texas Highway Dept. and Bureau of Public Roads, Washington, D. C. Availability: Original document in color until exhausted.

Descriptors: (*Floods, Texas), Rainfall, Rivers.

The report was prepared to combine the available runoff and rainfall information that might be used in the design of drainage structures spanning small streams in Texas. A summary of flood data for stream-gaging stations and partial-record stations, a list of peak discharges for floods at miscellaneous sites on small streams, a summary of outstanding point rainfall amounts, a brief rainfall-frequency presentation, and a flood-frequency discussion are given. (Author)

PB-169 503 **Field 8M, 13B, 18D**
CFSTI Prices: HC$4.00 MF$1.00
California State Div. of Highways, San Bernardino.
FIELD EVALUATION OF THE LANE-WELLS ROAD LOGGER,
by J. Puleo, Robert E. Smith, and William G. Weber, Jr. 9 Jun 65, 96p Rept. no. 0265
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Civil engineering, Soil mechanics), (*Soil mechanics, Instrumentation), (*Nuclear industrial applications, Soil mechanics), Roads, Soils, Moisture, Density, Measurement, Radiation measurement systems, Environmental tests.

Identifiers: Lane-Wells Road Logger.

The Road Logger, a truck-mounted nuclear gage for determining soil moisture and density, was evaluated for its potential use in compaction control. This equipment produces a continuous chart giving the soil moisture and density as the truck is driven over the compacted embankment. The data from the Road Logger was comparable in accuracy to the sand volume test. There was some sensitivity of the Road Logger to the surface condition in embankment materials and no surface effect on subgrade, base and similar materials. The indications are that there exists a definite potential for the use of the Road Logger in compaction control. The economic advantage of the use of the Road Logger is questionable on small contracts, but there may be some advantage when used on several large contracts. As the Road Logger obtains a large number of tests rapidly a new approach to the utilization of this data is presented. It is proposed to try the Road Logger on a construction project as the means of acceptance of compaction of earth materials. (Author)

9. ELECTRONICS AND ELECTRICAL ENGINEERING

AD-290 397 **Field 9A**
CFSTI Prices: HC$2.60
Microwave Associates, Inc., Burlington, Mass.
LONG LIFE K-BAND MAGNETRON.
Quarterly progress rept. no. 3, 1 Apr-30 Jun 62, by Norman Balmuth and David Hobbs. 30 Jun 62, 23p
Contract DA-36-039-sc-87359

Descriptors: (*Magnetrons, K Band), Design, Performance (Engineering).

During the third quarter, the first operational isolated anode magnetron with a conventional electron source was successfully completed; it operated normally and arc-free at the required ASDE pulse conditions, and at the same anode voltage, current power output and efficiency level as an acceptable 6551 magnetron. Electron gun revisions incorporated a new pole laminate method to give a tapered magnetic leakage flux profile within the pole piece cavity; these resulted in a magnet size increase. Mechanical difficulties prevented acquisition of beam tester data for the magnetron injection gun. Modulator revisions were completed causing it to be compatible with the proposed magnetron. (Author)

AD-402 336 **Field 9E, 14B**
CFSTI Prices: HC$13.60
Airborne Instruments Lab., Inc., Deer Park, N. Y.
NEW METHODS FOR MEASURING SPURIOUS EMISSIONS.
Final rept,
by J. Goldberg, O. F. Hinckelmann, L. J. Kuskowski, D. S. Levinson, and R. L. Sleven. Feb 63, 134p Rept. no.1112-1
Contract AF 30 (602)-2511
RADC TDR-63-80

Descriptors: (*Waveguides, Radio transmitters), (*Transmission lines, Radio transmitters), (*Noise (Radio), Microwave equipment), (*Microwave equipment, Radio transmitters), (*Test methods, Radio transmitters), Probes (Electromagnetic), Microwaves, Radiofrequency Power, Electric fields, Test equipment, Measurement, Wave transmission.

Newer, simpler, and more accurate methods of measuring the spurious-emission power of microwave transmitters were investigated. Two of these methods--the fixed-probe and the movable-probe methods--measure the power in the waveguide. A third, the free-space method, measures the power outside the transmission line. All of the methods are capable of accuracies of plus or minus 1 db or better. In all three methods, the electric-field amplitude is measured in a region where the modal phase constants and the wave impedance have essentially their free-space values. For the waveguide methods, this region is an oversize section of waveguide. For the free-space method, this region is outside the transmission line. The fixed-probe method lends itself most readily to automatic instrumentation and received the greatest emphasis during this program. Instrumentation was developed to measure peak power levels as low as -40 dbm in the 3 to 10 gc frequency range in less than 5 minutes per frequency. Primary emphasis was on measurements of power flow into matched loads. However, the extension of the fixed-probe

method to the measurement of power transferred into mismatched loads is also described. (Author)

AD-415 090 **Field 9A, 7D**
CFSTI Price: HC$5.60
TRACOR, Inc., Austin, Tex.
STUDY OF THE OXYGEN ELECTRODE MECHANISM.
Semi-annual rept. no. 3, 10 Jan-9 Jul 63,
by Paul T. Wrotenbery, Ray M. Hurd, andEarl S. Snavely, Jr. 24 Jul 63, 59p TRACOR-63-200-U
Contract DA-36-039-sc-89159, ARPA Order-247-61

Descriptors: (*Oxygen, Electrodes), (*Electrodes, Oxygen), (*Platinum, Electrodes), Electrochemistry, Reaction kinetics, Electrolytes.

Results of capacity, voltammetry, polarization, and rest potential studies on platinum in acidic and basic solutions are described. The implication of these results in terms of oxygen electrode kinetics are discussed. It is concluded that - Adsorbed oxygen cannot be detected by equilibrium capacity measurements on smooth platinum electrodes. Adsorbed oxygen on smooth platinum as detected by voltammetry methods is subject to displacement depending on the purity of the solution. Surface migration is a possible source of reducible oxygen only in restricted spaces. Experiments in a bulk solution with nonrestricted transport show no measurable surface migration component. By subjecting the electrode to a strongly preoxidizing environment, absorbed oxygen is detectable by capacity measurement. It is assumed that in this condition the surface is covered with a conducting oxide layer upon which oxygen is adsorbed. (Author)

AD-425 530 **Field 9B, 13B, 5K**
CFSTI Prices: HC$2.60
System Development Corp., Santa Monica, Calif.
SPAN REFERENCE MANUAL. SPAN: INTRODUCTION AND GENERAL DESCRIPTION.
Technical memo.,
by Vladimir V. Almendinger. 27 Nov 63, 24p
TM-1563/000/00
See also PB-169 044, PB-169 046, PB-169 556, AD-611 078, AD-613 284, AD-613 285, and AD-613 289.

Descriptors: (*Urban planning, Statistical analysis), (*Management planning, Social sciences), (*Data processing systems, Management engineering), Information retrieval, Statistical data, Urban areas.

Identifiers: SPAN (Statistical processing and analysis).

The SPAN system provides an integrated file processing and multivariate analysis capability for problems involving large data matrices with large numbers of variables. The system is oriented to problems of social science in general and urban data analysis in particular. This volume introduces the SPAN system and discusses its purpose and principal features. (Author)

AD-426 201 **Field 9A, 20C**
CFSTI Price: HC$2.00
Rantec Corp., Calabasas, Calif.
INVESTIGATION OF MICROWAVE DIELECTRIC-RESONATOR FILTERS.
Quarterly rept. no. 1, 1 Jul-30 Sep 63,
by Seymour B. Cohn and C. W. Chandler. 30 Sep 63, 32p
Contract DA-36-039-AMC-02267 (E),
Proj. Rantec-31625,
Task 5544-PM-63-91

Descriptors: (*Electric filters, Dielectrics), (*Dielectrics, Resonators), (*Resonators, Dielectrics), Microwave frequency, Dielectric properties, Configuration, Boundary value problems, Bandwidth, S band, Microwave equipment, Titanium compounds, Oxides, Waveguides.

Research concerns a study of the feasibility of high-dielectric constant materials as resonators in microwave filters. First- and second-order analyses of dielectric resonators are given for rectangular and cylindrical shapes. The first-order solution assumes the surface of the dielectric resonator to be an open-circuiting wall, while the second-order solution assumes boundary conditions that are more complex, yet subject to simple computation. The superiority of the second-order solution is shown by comparison of theoretical and experimental resonant-frequency data. However, a frequency discrepancy of about 10 per cent indicates that either the second-order solution requires further improvement, or that the assumed dielectric-constant value is in error, or both. Resonant frequency and unloaded Q measurements were made on six cylindrical samples having a wide range of diameter to length ratios. The experimental techniques are described. The unloaded Q of six TiO2 samples was measured and found to be about 7000 at S-band. Since these samples were not of the highest purity, even higher Q's should be possible. The effect of waveguide wall proximity was studied experimentally, and curves are given showing the effect of sample position in the waveguide on resonant frequency. (Author)

AD-428 248 **Field 9A, 14D**
CFSTI Price: HC$6.60
International Resistance Co., Philadelphia, Pa.
RELIABLE, LOW COST, STABLE RESISTORS GENERAL PURPOSE.
Quarterly rept. no. 2, 1 Aug-31 Oct 63,
by Sylvester J. Mattie and James W. Winkler. 31 Oct 63, 49p
Contract DA-36-039-AMC-02202 (E),

Descriptors: (*Resistors, Performance (Engineering)), Ceramic materials, Films, Stability, Reliability - (Electronics), Military requirements, Failure (Mechanics).

Processing of resistor groups in values up to 10,000 ohms has been completed and the 24,000 ohms unit partially completed for the ceramic slug resistors. The 130 ohms, 1000 ohms and 10,000 ohms units are on test and an analysis of the partial performance data is included. To date, no serious problem areas have been encountered. The 16 selected glaze resistor groups on the low temperature matrix have completed 1000 hours of test. The MIL-R-11D testing of 12 glaze resistor groups has been completed and the results were generally favorable. Some difficulty was experienced in breaking units due to mechanical clamping in the moisture resistance fixture. This has been corrected through modification of the test procedure. Failure analysis was initiated on the units failing the prescribed tests. The failures were X-rayed and the defects noted. The analysis is continuing. (Author)

AD-436 653 **Field 9A**
CFSTI Price: HC$4.60
Rantec Corp., Calabasas, Calif.
INVESTIGATION OF MICROWAVE DIELECTRIC-RESONATOR FILTERS.
Quarterly rept. no. 2, 1 Oct-31 Dec 63,
by S. B. Cohn and K. C. Kelly. 31 Dec 63, 50p
Contract DA-36-039-AMC-02267 (E),
Proj. Rantec-31625,
Task 5544-PM-63-91
See also AD-444 150.

Descriptors: (*Resonators, *Dielectrics), (*Filters - (Electromagnetic wave), Resonators), Microwave equipment, Waveguides, Titanium compounds, Dioxides, Magnetic moments, Waveguide filters, Dielectric properties, Measurement, Differential equations, Disks.

The serious effect of air gaps on the measurement of high dielectric-constant values is discussed. Two measurement techniques are described in which air gaps are made to be insignificant sources of error. Both methods utilize resonant modes having zero electric field at dielectric-sample surfaces adjacent to metal walls. In the first method, a cylindrical sample is placed in a close-fitting metal waveguide and resonated in the TEsub01delta mode. The air-filled regions of the waveguide on each side of the sample are cut off for the TEsub01 wave, so that inappreciable loss of resonant-mode energy occurs. In the second method, a cylindrical dielectric sample is placed at the center of a metallic radial-line pill box. The flat faces of the sample are in contact with the flat walls of the radial line. In this case, also, a circular-electric TEsub01 mode resonance is excited, and the electric field is zero on the sample surfaces. Practical techniques of identifying and measuring the desired resonant frequencies are explained, and exact formulas yielding the dielectric constant are given for both methods. Data obtained by these methods are presented, and the effect of density variation is discussed. (Author)

AD-444 150 **Field 9A**
CFSTI Price: HC$3.60
Rantec Corp., Calabasas, Calif.
INVESTIGATION OF MICROWAVE DIELECTRIC -RESONATOR FILTERS.
Quarterly rept., no. 3, 1 Jan 64-31 Mar 64,
by S. B. Cohn and K. C. Kelly. 31 Mar 64, 40p
Contract DA-36-039-AMC-02267 (E),
Proj. Rantec-31625,
Task 5544-PM-63-91
See also AD-436 653.

Descriptors: (*Resonators, *Dielectrics), (*Filters (Electromagnetic wave), Resonators), Materials, Titanium compounds, Dioxides, Electric filters, Microwave equipment, Measurement, Errors, Design, Feasibility studies, Waveguide filters, Band-pass filters, Dielectric properties, Disks.

A study is made of the feasibility of high-dielectric-constant materials as resonators in microwave filters, and the design information for such filters. Resonator materials selected has less tangents capable of yielding unloaded Q values comparable to that of waveguide cavities. The materials has dielectric constants of at least 75 in order that substantial size reductions can be achieved compared to the dimensions of waveguide filters having the same electrical performance.

AD-446 867 **Field 9A**
CFSTI Price: HC$4.60
Honeywell Research Center, Hopkins, Minn.
THIN FILM IMAGE CONVERTER.
Interim technical progress rept. no. 5, 24 Apr-23 Jul 64,
by Paul W. Kruse, Fred C. Pribble andRichard G. Schulze. 20 Aug 64, 41p
Contract DA-44-009-AMC-168 (T),
Proj. AF-8F23-11-001-07
See also AD-441 646, AD-474 878.

Descriptors: (*Image tubes, Army research), (*Image intensifiers (Electronics), Metal films), Electroluminescence, Arsenic alloys, Gallium alloys, Germanium, Epitaxial growth, Phosphorus alloys, Diodes (Semiconductors), Single crystals, Cadmium compounds, Arsenic compounds, Sulfides, Semiconducting films.

Identifiers: Cadmium sulfide, Arsenous sulfide.

Electrical contacts to n-GaAs have been prepared by electroless Ni plating, Pt sputtering in an argon atmosphere, and ultrasonic soldering. The influence of heat treatment under vacuum and electrical 'forming' on the current-voltage characteristics has been investigated. It has been found possible to produce ohmic contacts by several of these methods. The intensity of electroluminescent emission from GaP as a function of injection cur-

rent has been studied at 300K and 195K. At low current densities the intensity is proportional to the square of the current. As 2S3 and CdS aplanatic hyperhemispheres have been mounted on a GaP diode, using an immersion oil. The external quantum efficiency increased by a factor of 1.3 to 2.6. Epitaxial layers of GaAs on (111) oriented Ge have been prepared. Using a temperature differential of 80C, layers 14 micron thick have been prepared by means of a close-spaced transport method. Crystallinity has been verified by Laue and spectrogoniometric x-ray studies. (Author)

AD-453 421 **Field 9E**
CFSTI Price: HC$4.60
Rantec Corp., Calabasas, Calif.
INVESTIGATION OF MICROWAVE DIELECTRIC-RESONATOR FILTERS.
Quarterly rept. no. 4, 1 Apr-31 Aug 64,
by S. B. Cohn and E. N. Torgow. 31 Aug 64, 44p
Contract DA-36-039-AMC-02267 (E),
Proj. RANTEC-31625,
Task DA-5544-PM-63-91
See also AD-444 150.

Descriptors: (*Resonators, Dielectrics), (*Filters (Electromagnetic wave), Resonators), Disks, Dielectric properties, Waveguide filters, Microwave equipment, Band-pass filters, Differential equations, Magnetic moments, Waveguides.

An analysis is given of the coupling coefficient between dielectric-disk resonators arranged axially along the center line of a rectangular metal tube below cutoff. As in the case of the transverse orientation of disk axes, a formula is obtained that is reasonably convenient for computation. The formula includes terms for all of the modes excited by the resonators. In the axial orientation case, the TE10 and TE01 modes do not contribute to coupling unless the disks are misaligned. The lowest order coupling terms are for the TE20 and TE02 modes. Formulas for the TE10 (and TE01) coupling terms as a function of transverse and angular misalignments are given. These formulas are useful for determining mechanical positioning tolerances necessary in given filter designs. Experimental coupling-coefficient data are given for the axial orientation. Coupling coefficient versus center-to-center spacing was measured for a pair of dielectric disks in two different sizes of square tubing. Excellent agreement was found with curves computed from the coupling-coefficient formula. (Author)

AD-453 432 **Field 9B**
CFSTI Price: HC$4.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
MEMORY TESTER FOR THE DI/AN MINIATURE MAGNETIC CORE MEMORY SYSTEM,
by T. L. McGovern. Oct 64, 48p TG-605
Contract NOw-62-0604-c

Descriptors: (*Magnetic core storage, Test equipment), Design, Timing circuits, Reliability, Circuits, Wiring diagrams.

The DI/AN miniature magnetic core memory tester is a dynamic test unit which exercises the memory under test with a variety of input patterns. The tester was designed to substantiate specifications guaranteed by the manufacturer and investigate marginal or malfunctioning memory systems. The tester employs a maximum sequence counter to generate timing, pattern inputs and error sensing. All logic was designed with Signetics Inc. 'K' series integrated elements mounted on special breadboard cards. (Author)

AD-457 825 **Field 9A**
CFSTI Prices: HC$16.40 MF$1.75
General Electric Co., Syracuse, N. Y. Pickup Tube Operation.
DESIGN, DEVELOPMENT, AND FABRICATION OF AN ULTRA-HIGH-RESOLUTION CATHODE-RAY TUBE.
Final rept. no. 8, 21 May 62-1 Sep 64,
by K. Schlesinger and E. T. Rate. 1 Sep 64, 194p
Contract DA-36-039-sc-90726 (E)
N65 22350

Descriptors: (*Cathode ray tubes, Design), Resolution, Performance (Engineering).

The 5 in. UHR tube uses a two-spiral optical system for focus and collimation at 18KV, it puts an average of 4-microamperes through a spot of 1/3 mil. This resolution is fully preserved within a 4 in. screen diameter by three dynamic corrections: one for focus and two for astigmatism. An analog computer derives these signals from deflection. It uses a new type of product-generator called the 'RovingSquare Tube' (RST). Spot-size and shape are measured objectively by a new type of spot-dissector, using crossed slits and circular sweep. Errors from phosphor decay are eliminated by subcarrier modulation at 10 megacycles. Twelve ultra-high-resolution (UHR) tubes, plus the magnetic components required to operate them, were constructed. (Author)

AD-461 318 **Field 9/A**
CFSTI Prices: HC$3.60
Rantec Corp., Calabasas, Calif.
INVESTIGATION OF MICROWAVE DIELECTRIC-RESONATOR FILTERS.
Quarterly rept. no. 5, 1 Sep-30 Nov 64,
by S. B. Cohn and E. N. Torgow. 30 Nov 64, 32p
Contract DA-36-039-AMC-02267 (E),
Proj. Rantec-31625,
Task 5544-PM-63-91

Descriptors: (*Band-pass filters, Resonators), (*Resonators, *Dielectrics), Waveguide filters, Dielectric properties, Transmission lines, Mathematical analysis, Stability, Temperature, Microwave equipment, Low-pass filters, Theory, Coupling circuits, Titanium alloys, Dioxides.

The use of dielectric resonators in band-stop filters is discussed. Formulas are derived that predict the external Q (Q (ex)) of the coupled band-stop resonator as a function of the resonator's parameters and its position in a TEM-line cross section. Application of the Q (ex) formulas to band-stop filter design is investigated. A formula is presented for the required Q (ex) values of the resonators in terms of a low-pass prototype filter. Several band-stop filters were designed and tested. Agreement between measured and theoretical performance is excellent. Additional dielectric samples have been measured. Among the samples tested are several that are significantly more dense than earlier samples. These dense samples exhibited dielectric constants as high as 113. The quality of these samples from the point of view of Q was found to be comparable to the samples tested previously. (Author)

AD-465 668 **Field 9A**
CFSTI Prices: HC$3.60 MF$0.50
Rantec Corp., Calabasas, Calif.
INVESTIGATION OF MICROWAVE DIELECTRIC -RESONATOR FILTERS.
Quarterly rept. no. 6, 1 Dec 64-28 Feb 65,
by Seymour B. Cohn and Eugene N. Torgow. 28 Feb 65, 39p
Contract DA-36-039-AMC-02267 (E),
Projs. DA-IP6-22001A057, RANTEC-31625,
Task DA-IP6-22001A057-02,
ECOM 02267-6
See also AD-453 421.

Descriptors: (*Resonators, *Dielectrics), (*Filters - (Electromagnetic wave), Resonators), Waveguide filters, Dielectric properties, Transmission lines, Numerical analysis, Stability, Temperature, Measure ment, Band-pass filters, Microwaves, Theory, Coupling circuits, Titanium compounds, Dioxides, Waveguides, Resonant frequency, Frequency shift.

The effect of metal-wall preximity on resonant frequency and unloaded Q of a dielectric resonator is considered. It is shown that nearby walls, such as those of a surrounding nonpropagating waveguide, raise the resonant frequency and degrade the unloaded Q. A rigorous solution to the problem is not feasible, and therefore an approximate analytical approach based on the proximity of a single infinite plane metal wall is proposed instead. The effect of the wall on resonant frequency is computed first. Then a perturbation method is applied to obtain a formula for the Q of the resonator loaded by the dissipation loss on the metal wall. Next the shift in resonant frequency and the unloaded Q of a resonator in a rectangular waveguide are obtained by superimposing the effects of the individual four walls. A comparison of calculated and measured data shows good agreement in the transverse-orientation case. However, agreement in the axial-orientation case is poor. It is indicated that certain sources of error tend to cancel in the transverse case, while adding in the axial case. Further discussion of the axial case will be given in the next quarterly report. The results of further investigation of band-stop filters in TEM line are contained in this report. (Author)

AD-468 378 **Field 9E, 13H**
CFSTI Prices: HC$4.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
THE MINISTICK PROCESS FOR PACKAGING INTEGRATED CIRCUIT FLAT PACKS.
Technical memo.,
by Carlton F. Noyes. Apr 65, 46p TG-675
Contract NOw-62-0604-c

Descriptors: (*Integrated circuits, Packaging), Manufacturing methods, Modules (Electronic), Dielectrics, Chemical milling, Laminates, Electric connectors, Welding.

Identifiers: Ministick process.

The Ministick process for fabricating flat-pack type multilayer circuitry boards was developed because of the need for space circuitry that meets ease of design and manufacture requirements. Starting with a circuit design in the form of a logic diagram, the design phase progresses to the final artwork template. This template, photo reduced, is the basic tool in the fabrication of the assembly frames. The circuit of each layer of an assembly frame is produced by chemically milling substrates which have been sensitized with the desired circuit by use of the final artwork template. These substrates are made by laminating an epoxy glass cloth dielectric material to a Kovar sheet. Individual circuit layers are then combined to form an assembly frame, and Integrated Circuit modules are welded to the frame to complete the circuitry. When more than one assembly frame is required to complete the circuitry, the frames are electrically connected by means of a mother board. Although multilayer circuit boards are used in this procedure, no interlayer connections are required. (Author)

C13.46:247 **Field 9A, 20L, 11F**
CFSTI Price: MF$0.75
National Bureau of Standards, Washington, D.C.
SURVEY OF MAGNETIC THIN FILM MATERIALS.
Technical note,
by George W. Reimherr. 25 Sep 64, 58p NBS-TN-247
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.40.

Descriptors: (*Magnetic materials, Films), (*Metal films, Magnetic materials), (*Thin films (Storage devices), Magnetic materials), Crystal structure, Physical properties, State-of-the-art reviews.

The survey lists the materials reportedly made as a magnetic thin film, along with some of their properties and potential applications. Research activity using the less-frequently mentioned magnetic film materials is noted. About 200 references are cited. (Author)

N66-13350 **Field 9F**
CFSTI Prices: HC$2.00 MF$0.50
Microwave Physics Corp., Garland, Tex.
THE DEVELOPMENT OF AN S-BAND PARAMETRIC AMPLIFIER USING NEW TECHNIQUES FOR GAIN STABILIZATION.
Final rept.
Nov 65, 26p
Contract NAS8-11817
NASA CR-68605

Descriptors: (*Parametric amplifiers, Gain), (*Gain, Stabilization), S-band.

N66-13363 **Field 9A**
CFSTI Prices: HC$5.00 MF$1.00
Research Triangle Inst., Durham, N. C. Solid State Lab.
FEASIBILITY STUDY OF PIEZOTRANSISTOR ACCELEROMETERS.
Annual rept.
Sep 65, 179p
Contract NASR-222
NASA CR-68593

Descriptors: (*Transducers, Accelerometers), Semi conductor devices.

N66-14957 **Field 9F**
CFSTI Prices: HC$2.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
ARRAY SYNTHESIS - A LEAST INTEGRAL SQUARE ERROR METHOD,
by R. T. Compton, Jr. 20 Aug 65, 34p Rept. no. 1691-14
Grant NsG-448
NASA CR-69206

Descriptors: (*Antenna radiation patterns, Least squares method).

N66-15017 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
PHOTON-ACTUATED MULTIPLEX SWITCH DEVELOPMENT,
by D. Bergens. 15 Dec 65, 28p JPL-TR-32-794
Contract NAS7-100
NASA CR-69140

Descriptors: (*Electronic switches, Photons), (*Multiplex operation, Solid state devices).

N66-15070 **Field 9C**
CFSTI Prices: HC$3.00 MF$0.50
General Dynamics/Convair, Huntsville, Ala.
SIMULATION OF SELECTED DISCRETE NETWORKS. VOLUME THREE. SATURN 1-C ENGINE CUTOFF SYSTEM MODEL.
Final rept.
Oct 65, 51p GD/C-DDF-65-005, VOL. III
Contract NAS8-20016
NASA CR-69143

Descriptors: (*Netowrks, Simulation), Programming (Computers).

Identifiers: Saturn IC.

N66-15102 **Field 9A**
CFSTI Prices: HC$2.00 MF$0.50
CBS Labs., Stamford, Conn.
1-1/2 INCH RUGGED IMAGE DISSECTOR TUBE.
Final rept., 25 Feb-18 Sep 64,
by S. Juchnowycz. 12 Oct 64, 43p
Contract NAS7-100
Prepared for Jet Propulsion Lab. Calif. Inst. of Tech., Pasadena, rept. no. JPL-950848.

Descriptors: (*Image tubes, Spacecraft).

NAA-SR-11231 **Field 9B, 18K**
CFSTI Prices: HC$3.00 MF$0.75
Atomics International, Canoga Park, Calif.
CHAD - CODE TO HANDLE ANGULAR DATA,
by R. F. Berland. 31 Dec 65, 79p
AT(11-1)-GEN-8

Descriptors: (*Neutron scattering, Programming (Computers)), (*Programming (Computers), Special functions (Mathematical)).

Identifiers: Chad.

NBS Handbook 100 **Field 9A**
CFSTI Prices: HC$0.50 MF$0.50
National Bureau of Standards, Washington, D. C. Inst. of Applied Technology.
COPPER WIRE TABLES.
21 Feb 66, 47p
Supersedes NBS-Circular-31. Hard copy also available from Superintendent of Documents, GPO, Washington, D. C. 20402, $0.50.

Descriptors: (*Copper, Electric wire), (*Electric wire, Standards), (*Handbooks, Electric wire), Tables, Density, Resistance (Electrical), Wire, Electrical conductance, Thickness, Temperature.

This Handbook is a revision of the Copper Wire Tables previously published as NBS Circular 31. It reflects changes in the nominal diameters of gages 45 and smaller and extends the tables to 56 gage. The changed diameters and extended range were established in 1961 by the Committee on Wires for Electrical Conductors of the American Society for Testing and Materials and were published as ASTM Standard B258-61. They have also been approved as American Standard C7.36-1961 by the American Standards Association. To reduce internal inconsistencies, tables 5 through 14 were completely recomputed by the ASTM Committee on Wires for Electrical Conductors. The first edition of Circular 31 was published in 1912 at the request of the American Institute of Electrical Engineers. Subsequent editions appeared in 1914 and 1956.

Patent 3,229,079 **Field 9B**
BINARY DIVIDER.
Patent assigned to Navy,
by Harry D. Zink, Jr. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Computer logic, Binary arithmetic), Digital computers, Patents.

The binary divider divides without the use of iterative techniques. The circuit is divided into four sections. One register and its associated gates receive the dividend and apply it to the subtractor. A second register receives the divisor and applies it bit by bit in serial fashion to a third register which in turn applies it to the subtractor. The second register provides the divisor to the third register in proper sequence to achieve the registration between the dividend and the divisor in the subtractor.

Patent 3,229,105
Field 9A, 20F, 14E
IMAGE INTENSIFIER DEVICE WITH MIRROR ON REAR SURFACE, PHOTOCATHODE ON FRONT SURFACE, AND FIBER OPTICS IN CENTER OF REAR SURFACE.
Patent assigned to Air Force,
by Hermann R. Mestwerdt and Werner R. Rambauske. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Image intensifiers (Electronics), Fiber optics), Photocathodes, Photographic equipment, Night photography.

The electro-optical apparatus is primarily for photographic reproductions, or observation by optical rays from a distant object. The optical rays are converted into electron rays for intensification after which they are reconverted to visible rays for observation or photographic reproduction. The system is primarily for night photography or viewing without artificial illumination. A photocathode is used in the system.

Patent 3,229,118 **Field 9A**
GATED COUNTER HAVING DIODE ISOLATING INPUT FROM GATE.
Patent assigned to Navy,
by Alan M. Demmerle. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Gates (Circuits), Counting methods), Diodes (Semiconductor), Relaxation oscillators, Clocks, Transistors.

The circuit is designed for use in a gated clock generator in which a 500 kc. electronic clock is to be gated on with a jitter of .125 u second. An oscillator is fed directly into a multivibrator and a gate is used to unbalance a bistable multivibrator, during the gate off time, to the point where it is inoperative. The oscillator is now essentially isolated from effects due to the gate. The oscillator is driving nearly the same load during the off time as during the on time. The gate is fed into the base return resistor through the wiper arm of a potentiometer. The wiper arm setting is dependent on the particular transistors used.

Patent 3,229,122 **Field 9A, 17B**
SLOW SCAN GENERATOR CIRCUIT.
Patent assigned to AEC,
by James L. Engle. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Cathode ray tubes, Scanning), (*Generators, Scanning), Television receivers, Circuits, Modulators, Demodulators, Synchronization (Electronics).

The slow scan generator can be connected to the deflection yoke of a television picture tube without requiring special high impedance deflection coil winding. The slow scan generator includes a ring modulator and a ring demodulator coupled to the ring modulator, controlling the ring modulator and the ring demodulator on both sides of the coupling transformer by a carrier oscillator so that both are synchronized.

Patent 3,229,142 **Field 9A**
WIDE BAND MULTICHANNEL ELECTRON MULTIPLIER HAVING IMPROVED PATH SHIELDING AND GAIN CHARACTERISTICS.
Patent assigned to AEC,
by Ralph Kalibjian. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Electron multipliers, Wideband), Gain, Electromagnetic shielding, Multiple operation, Electron tube parts, Electric fields, Secondary emission.

The multipliers are used for a variety of purposes such as quantization of electrical signals, coding, and intensification of images. The channeled electron multiplier has a Venetian-blind dynode configuration wherein each channel is defined by a pair of louvers on a series of 'cascaded' dynodes. Shields defining a recess are electrically connected to each dynode such that the free edge of the lou-

ver of the preceding dynode extends into the recess of the shield to prevent crosstalk between channels and enhance the electric field of the multiplier. The enhanced electric field results in reducing the electron transit time through the multiplying region, thus minimizing transit-time dispersion.

Patent 3,229,164 **Field 9E**
ELECTRICAL RECYCLING CIRCUIT FOR CONTROLLING AND PROTECTING FUNCTIONAL EQUIPMENT.
Patent assigned to Navy,
by William B. McCartney and Edward O. Uhrig.
11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Power supplies, Limiters), (*Limiters, Power supplies), Circuits, Integrated circuits, Patents.

The overload protection circuit is for a multiplicity of power supplies of both positive and negative polarity. The circuit comprises an integrated, transistorized circuit. The circuit is rapid in action and positive in operation.

Patent 3,229,193 **Field 9E**
PULSED FERRITE GENERATOR UTILIZED AS A FREQUENCY CONVERTER IN THE MICROWAVE OR MILLIMETER WAVE RANGE.
Patent assigned to Army,
by Tor Schaug-Pettersen, Brian J. Elliott, andHerbert J. Shaw. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Frequency converters, Microwave equipment), Patents, Pulse generators, Ferromagnetic materials, Microwave frequency, Pumping (Electronics).

The pulsed ferrite generator operates at room temperature. A pump signal is coupled to a ferrite sphere by use of a circular wave-guide and stripline. Output signals are extracted from the ferrite sphere by use of the wave-guide. An output guide ends in a choke and contains a circular polarizer. A continuous D. C. field is applied to the ferrite by a coil and a pulsed D. C. field is applied to the ferrite by a single loop coil.

Patent 3,229,197 **Field 9C, 13H**
PULSED ELECTROMAGNETIC FIELD SYSTEM FOR NONDESTRUCTIVE TESTING.
Patent assigned to AEC,
by Claus J. Renken, Jr. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Non-destructive testing, Electro magnetic fields), Surface properties, Pulse generators, Test methods, Patents, Test equipment.

The device is for detecting subsurface irregularities in a metal sample. Pulsed electromagnetic fields of alternate long and short time duration are transmitted into the sample through a mask. A receiving coil detects the reflected pulsed fields from the sample. Components are provided for discriminating between the long and short pulsed field to determine the presence of subsurface flaws in the sample.

Patent 3,229,198 **Field 9C, 13H**
EDDY CURRENT NONDESTRUCTIVE TESTING DEVICE FOR MEASURING MULTIPLE PARAMETER VARIABLES OF A METAL SAMPLE.
Patent assigned to AEC,
by Hugo L. Libby. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Non-destructive testing, Metals), Test equipment, Signal generators, Magnetic properties, Measurement, Electric currents, Patents.

Identifiers: Eddy current equipment.

The eddy current device measures multiple parameter variables of a metal sample. A test specimen and a reference test specimen are used. A generator supplies current to test coils. Components of the device include a null balance trimmer, an amplifier, an analyzer and a plurality of parameter readout meters. The device measures for thickness, electrical conductivity and probe-to-sample spacing.

Patent 3,229,204 **Field 9C**
PHASE METER CALIBRATOR.
Patent assigned to Navy,
by Barry W. Poehlman. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Phase meters, Calibration), Patents, Phase shift, Phase measurement, Circuit.

The device measures phase shift in a plurality of electrical circuits or for indicating the error in a phase measuring device. The circuit includes the device to be calibrated, inputs, a phase shifter, two capacitors, a potentiometer, two squaring amplifiers and a time interval meter.

Patent 3,229,205 **Field 9C**
MONITOR DEVICE FOR MICRO-WAVE PHASE SHIFTERS UTILIZING TWO HYBRID COUPLERS.
Patent assigned to Navy,
by Fred T. Pitts and Tommy S. Weaver. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Monitors, Phase shifters), (*Radar equipment, Monitors), Microwave equipment, Patents, Doppler systems, Malfunctions, Radar equipment, Airborne, Waveguide couplers.

The device is for monitoring a Doppler phase shifter which is used in an airborne radar system. An RF input is applied to a first hybrid coupler and the signal is equally divided between two output arms which are at opposite ends of the coupler. The output signals are 90 electrical degrees out of phase. The outputs from the first hybrid coupler are applied to identical phase shifters and the outputs from these identical phase shifters are applied to a second hybrid coupler. In the second hybrid coupler the one signal that was originally shifted is again shifted 90 electrical degrees so that the RF through the two paths arrive in phase at one output arm but arrives 180 electrical degrees out of phase at the other output arm and cancels. If either one of the two phase shifters fails or operates improperly, cancellation no longer occurs and an output appears. This output is detected, and then amplified and used to operate an indicator.

Patent 3,229,206 **Field 9C**
IN-LINE WAVEGUIDE CALORIMETER WATTMETER USING SPACED HEAT SINKS AND TEMPERATURE MEASURING MEANS THEREBETWEEN.
Patent assigned to AEC,
by Melvin M. Brady and Kenneth B. Mallory. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Wattmeters, Radiofrequency power), (*Calorimeters, Waveguides), Patents, Heat sinks, Microwave frequency, Measurement.

The in-line waveguide calorimeter is for microwave power measurement. The device measures the temperature rise in the walls of a waveguide caused by the attenuation of the microwave power flowing through the waveguide. The circuit includes a power supply, four wire resistances wound about the length of the waveguide in the form of a bridge circuit, a trimmer resistor and an output voltmeter.

Patent 3,229,213 **Field 9A, 9B**
BISTABLE ELECTRON DEVICE COMPRISING AXIALLY SPACED DYNODES.
Patent assigned to Navy,
by James W. Schwartz. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Electron multipliers, Computer logic), Patents, Stability, Electrodes.

The multiplier is used as a flip-flop in computers. The electron multiplier is enclosed in a glass tube. Components include a cathode with an emissive surface, a control electrode and an accelerating electrode, both with a central aperture for accelerating the beam of electrons, a cylindrical field former with a dynode at each end, collector electrodes and a UHF source.

Patent 3,229,220 **Field 9E**
ELECTRON BEAM AMPLIFIERS AND OSCILLATORS.
Patent assigned to Army,
by Burton J. Udelson. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Microwave amplifiers, Waveguide couplers), Patents, Electron beams, Radiofrequency oscillators.

The microwave amplifier is extremely simple to construct and is very efficient in operation. The amplifier includes two electron beam fast wave couplers, an input coupler and an output coupler. The amplifier requires no pumping section, neither RF nor D.C.

Patent 3,229,227 **Field 9E**
PULSED OSCILLATORS.
Patent assigned to Navy,
by Alfred E. Popodi. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Oscillators, Electromagnetic pulses), Patents, Transistors, Circuits, Electronic switches.

The pulses oscillator is used in telemetry, sweep circuits for displays, modulators, time measurements, and the like. The oscillator includes an NPN type resistor, a resonant circuit including two capacitors in series across an inductance, a voltage power supply source, a switch transistor of the NPN type, a clamping diode and a plurality of resistances.

Patent 3,229,228 **Field 9E**
ADJUSTABLE FREQUENCY WIEN-BRIDGE OSCILLATOR.
Patent assigned to Navy,
by Zack D. Reynolds. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Oscillators, Electric bridges), Feedback, Circuits, Stability, Patents.

The oscillator has a large adjustable frequency range and good amplitude stability. The oscillator is equipped with a non-inverting amplifier having two inputs and an output, a positive feedback network comprised of two series-parallel circuits which are connected by a potentiometer, and a temperature sensitive resistance.

Patent 3,229,229 **Field 9A**
VARIABLE RESONANT FREQUENCY CIRCUITS.
Patent assigned to Army,
by Louis M. Tozzi. 11 Jan 66

Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Circuits, Resonant frequency), Patents, Broadband.

The resonant circuit has a resonance frequency which varies linearly with some control input. The circuits have extremely wide bandwidths. The network consists entirely of passive reactive elements. These elements are arranged in plurality of loops and the variable element is placed in one of these loops.

Patent 3,229,258 **Field 9B, 17B**
DIGITAL STORAGE SYSTEM.
Patent assigned to Navy,
by Harry L. Heibeck, Charles G. Wilhelm andWilliam M. Oleson. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Data storage systems, Digital systems), Binary arithmetic, Delay lines, Pulse communication systems, Patents.

The digital storage system has a short access time and a high read-out rate. It is used in burst communication systems. The system is a binary-coded digital system and it employs a plurality of dynamic storage lines, one of which is used to store index bits, the others being used to store data bits. The storage lines are fed pulses in parallel from a read-in device and then removed serially at a much higher speed.

Patent 3,229,278 **Field 9D**
TIME CODE GENERATOR.
Patent assigned to Navy,
by Walter E. Hanson and Edgar H. Fischer. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Timing devices, Coding), (*Time signals, Generators), Patents, Binary arithmetic, Photoelectric cells (Semiconductor).

The time code generator includes a plurality of apertured coaxial discs, a synchronous motor for rotating the discs, light sources and sensors and a plurality of amplifiers having the light sources connected in control thereof. The signals from each amplifier are combined into a common output. The light applied to the apertures in the discs is strobed so that not more than one aperture in each disc is illuminated at a time.

Patent 3,237,014 **Field 9B**
SPECIAL FIRST STAGE OF MAGNETIC CORE BINARY COUNTER.
Patent assigned to Army,
by Arnold Shafritz and Hans B. Marx. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Magnetic cores, Computer logic), (*Computer logic, Counting methods), Patents, Binary arithmetic.

The magnetic core network is for feeding incoming pulses to be counted to a binary counter having at least two counter stages. The network includes an EXCLUSIVE OR circuit and NEGATION and DELAY cores. Nine cores are utilized in the 'logic' diagram of the circuit.

Patent 3,237,029 **Field 9A, 9C**
SOLID STATE STEPPING SWITCH.
Patent assigned to Army,
by Jimmy W. Cosby. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Trigger circuits, Calibration), (*Calibration, Trigger circuits), (*Electronic switches, Calibration), Patents, Semiconductor devices, Voltage, Telemeter systems, Guided Missiles.

The triggering circuit is for calibrating telemetry instruments of missiles while in flight. The triggering circuit acts like a 'one-shot multivibrator' and has a very small number of parts. Transistors are used in the circuits. The circuit has a variable 'on time' and could be used in solid state commutators, missile roll position indicators and to code information of some types.

Patent 3,237,122 **Field 9E, 9A**
STRIPLINE OSCILLATOR.
Patent assigned to Army,
by Morris Campi. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Oscillators, Printed circuits), Patents, Microwave equipment.

The high frequency oscillator is produced by printed circuit techniques. A parallel plane vacuum tube is combined with stripline circuits made on a printed circuit board. The stripline circuits are designed to resonate with the plate to grid interelectrode capacitance of the tube.

PB-169 243 **Field 9C**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
COAXIAL SLOTTED LINES WITH TYPE N CONNECTORS FXR N101A AND N101B, 805C, 806B, (HEWLETT-PACKARD), 231N, (NARDA), IM-92/U, IM-100/USM-37.
Technical Manual Instrument Calibration Procedure, GV-07.
1 Nov 65, 30p NAVWEPS-17-20GV-07

Descriptors: (*Coaxial cables, Calibration), Navy equipment, Instruction manuals, Test methods, Navy equipment.

The manual describes the calibration procedure for the FXR N101A and N101B, the Hewlett-Packard 805A, 805C, and 806B, and the Narda 231N coaxial slotted lines.

PB-169 365 **Field 9C**
CFSTI Prices: HC$1.60 MF$0.50
SSCO-Standards Lab., Inc., Southfield, Mich.
CW FILTER AIRTRON 407655.
Technical manual instrument calibration procedure, AN-10.
1 Dec 65, 11p
Contract N123 (62861)35059A
NAVWEPS 17-20AN-10

Descriptors: (*Band-pass filters, Calibration), Instruction manuals, Test methods, Naval equipment.

The manual describes the calibration procedure for an Airtron Model 407655 C. W. Filter, which essentially passes any signal in the frequency range from 5.4 to 5.75 Gc.

PB-169 366 **Field 9A, 14B**
CFSTI Prices: HC$1.60 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
DYNAMIC BETA TRANSISTOR TESTOR MODEL 870.
Technical manual instrument calibration procedure, AY-18.
1 Dec 65, 16p NAVWEPS 17-20AY-18

Descriptors: (*Transistors, Test equipment), (*Test equipment, Calibration), Naval equipment, Instrumentation.

A procedure is given that describes the calibration of the Hickok Electrical Instrument Company Model 870 Dynamic Beta Transistor Tester. The Test Instrument provides for testing all small, medium and power transistors under typical operating conditions.

PB-169 388 **Field 9C**
CFSTI Prices: HC$2.60 MF$0.50
SSCO Standards Lab., Inc., Southfield, Mich.
OSCILLOSCOPES 515, 515A, RM159tektronix0.
Technical manual instrument calibration procedure, AW-36.
1 Dec 65, 28p
Contract N123 (62861)35059A
NAVWEPS 17-20AW-36

Descriptors: (*Oscilloscopes, Calibration), Test equipment (Electronics), Instruction manuals, Test methods.

The manual describes the calibration procedure for the Tektronix 515, 515A, and RM15 Oscilloscopes which are general purpose laboratory oscilloscopes, having calibrated sweep rates, calibrated vertical sensitivities, a square wave calibrator, two vertical input connectors, and provisions for internal or external triggering modes.

PB-169 389 **Field 9C**
CFSTI Prices: HC$1.60 MF$0.50
Boeing Co., Seattle, Wash. Aero-Space Div.
UNIT I-F AMPLIFIER TYPE 1216-A (GENERAL RADIO CO.).
Technical manual instrument calibration procedure, AA-22.
1 Dec 65, 14p
Contract N123 (62861)35056A
NAVWEPS 17-20AA-22

Descriptors: (*Intermediate frequency amplifiers, Calibration), Instruction manuals, Test methods, Naval equipment.

The manual describes the calibration procedure for the General Radio Company Type 1216-A Unit I-F Amplifier. The Test Instrument is a 30 Mc I-F amplifier, with a calibrated meter for monitoring signal levels, and an internal, calibrated, 70 db step attenuator, to extend the meter range. The Test Instrument has a detector output only.

PB-169 390 **Field 9C**
CFSTI Prices: HC$1.60 MF$0.50
Boeing Co., Seattle, Wash. Aero-Space Div.
SUMMATION BRIDGE AN/URM-23 PRD 14H.
Technical manual instrument calibration procedure, GP-07.
15 Nov 65, 16p
Contract N123 (62861)35056A
NAVWEPS 17-20GP-07

Descriptors: (*Power meters, Calibration), (*Radiofrequency, Power meters), Electrical bridges, Instruction manuals, Test methods, Naval equipment.

The manual describes the calibration procedure the AN/URM-23 Summation Bridge, and the MX-1309/URM-23 Power Measuring Kit (Bolometer Mount and Attenuators). The Test Instrument is a radio-frequency power meter capable of measuring 5 milliwatts to 5 watts of power in the 1 to 4 Gc frequency range.

PB-169 391 **Field 9A, 9C**
CFSTI Prices: HC$1.10 MF$0.50
SSCO Standards Lab., Inc., Southfield, Mich.
PHASE SHIFTER PS 30. (INDUSTRIAL TEST EQUIPMENT CO.).
Technical manual instrument calibration procedure, AZ-19.
1 Dec 65, 9p
Contract N123 (62861)35059A
NAVWEPS 17-20AZ-19

Descriptors: (*Phase shifters, Calibration), Instruction manuals, Test methods, Naval equipment.

The manual describes the calibration procedure for the Industrial Test Equipment Co. Model PS 30 Phase Shifter. The Test Instrument is a synchro

with an R. C. network across the stator winding, which is used to shift the phase of the 30 cps input signal by any amount from 0 to 360 degrees.

PB-169 392 **Field 9A, 9C**
CFSTI Prices: HC$1.60 MF$0.50
SSCO Standards Lab., Inc., Southfield, Mich.
LOW PASS FILTER MICROPHASE LT-6000.
Technical manual instrument calibration procedure, GN-12.
1 Dec 65, 13p
Contract N123 (62861)35059A
NAVWEPS 17-20GN-12

Descriptors: (*Low-pass filters, Calibration), Band-pass filters, Instruction manuals, Test methods, Navy equipment.

The manual describes the calibration procedure for the Microphase LT-6000 Low Pass Filter. The filter passes frequencies below 6 Gc with minimum attenuation and attenuates frequencies above 10.2 Gc by at least 60 db.

PB-169 393 **Field 9A, 9C**
CFSTI Prices: HC$1.10 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
VHF ATTENUATORS 355A, 355C (HEWLETT-PACKARD).
Technical manual instrument calibration procedure, AN-07.
1 Dec 65, 10p NAVWEPS-17-20AN-07

Descriptors: (*Attenuators, Calibration), (*Very high frequency, Attenuators), Instruction manuals, Test methods, Naval equipment.

The manual describes the calibration procedure for the Hewlett-Packard 355A and 355C VHF attenuators. These instruments each consist of four attenuator sections which provide attenuation in 1-db steps from 0 to 12 db.

PB-169 394 **Field 9C**
CFSTI Prices: HC$1.60 MF$0.50
Boeing Co., Seattle, Wash. Aero-Space Div.
WIDE BAND SWEEP GENERATOR 900-A (JERROLD).
Technical manual instrument calibration procedure, AG-88.
15 Nov 65, 12p
Contract N123 (62861)35056A
NAVWEPS 17-20AG-88

Descriptors: (*Sweep generators, Calibration), Broadband, Instruction manuals, Test methods, Naval equipment.

The manual describes the calibration procedure for the Jerrold 900-A Wide Band Sweep Generator which supplies a sweep signal with center at any frequency from 500 kc to 1000 Mc and with an adjustable sweep width.

PB-169 422 **Field 9A, 14B**
CFSTI Prices: HC$4.60 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
WAVEGUIDE ISOLATORS FREQUENCY RANGE, 2.6 TO 26.5 GHZ.
Technical manual instrument calibration procedure, GY-03.
15 Dec 65, 49p NAVWEPS 17-20GY-03

Descriptors: (*Waveguides, Electronic equipment), (*Electronic equipment, Calibration), (*Test equip ment, Calibration), Naval equipment, Instrumentation.

A procedure is given that describes the calibration of waveguide isolators with operating frequencies in the range of 2.6 to 26.5 GHz.

PB-169 469 **Field 9A, 11C, 11B**
CFSTI Price: HC$1.60
Battelle Memorial Inst., Columbus, Ohio.
INVESTIGATIONS OF RARE-EARTH OXIDE CATHODES.
by G. B. Gaines. 1 Mar 60, 20p Scientific rept. no. 2
Contract AF 19 (604)-5691,
Proj. AF-4156,
Task 46310
AFCRC TN-60-559,
AD 239 317

Descriptors: (*Thermionic emission, Oxides), (*Rare earth compounds, Cathodes), (*Cathodes, Thermionic emission), Gadolinium compounds, Neodymium compounds, Electrophoresis, Coating.

PB-169 478 **Field 9C**
CFSTI Prices: HC$1.60 MF$0.50
Bureau of Naval Weapons, Washington, D. C.
FREQUENCY CONVERTER 5254A (HEWLETT-PACKARD).
Technical manual instrument calibration procedure, AF-31.
15 Dec 65, 11p NAVWEPS-1720AF-31

Descriptors: (*Frequency converters, Calibration), Instruction manuals, Test methods, Naval equipment.

The manual describes the calibration procedure for the Hewlett-Packard 5254A frequency converter. The Test Instrument is a plug-in unit which extends the frequency measuring capability of the Hewlett-Packard 5245L electronic counter from 0.3 to 3.0 GHz.

PB-169 556 **Field 9B, 13B, 5K**
CFSTI Prices: HC$2.00 MF$0.50
System Development Corp., Santa Monica, Calif.
SPAN REFERENCE MANUAL. SPAN SYSTEM OPERATION.
Technical memo.,
by Vladimir V. Almendinger. 1 Dec 65, 33p
TM-1563/010/02
Contract CPR-11-1543
Supersedes AD-613 284. See also AD-425 530.

Descriptors: (*Data processing systems, Management engineering), (*Management planning, Social sciences), (*Urban planning, Statistical analysis), Urban areas, Management control systems, Control sequences, Data storage systems, Analysis of variance, Social sciences, Specifications.

Identifiers: SPAN (Statistical processing and analysis), IBM 7090, IBM 7094.

This volume provides information required by the user for the running of the system on an IBM 7090 or 7094 computer. (Author)

PB-169 576 **Field 9A, 11G, 11B, 11C**
CFSTI Price: HC$3.60
Armour Research Foundation, Chicago, Ill.
DEVELOP AND EVALUATE HIGH TEMPERATURE DIELECTRIC FOR RF COAXIAL CABLE.
Final rept.
5 Feb 60, 40p ARF-6040-12
Contract NObs-77032
AD 240 519

Descriptors: (*Electric insulation, Electric wire), (*Coatings, Electric wire), (*Coaxial cables, Electric insulation), (*Dielectrics, Electric insulation), Glass textiles, Aluminum, Silver, Extrusion, Ceramic coatings, Aluminum compounds, Oxides, Clay, Boron compounds, Nitrides, Mica, Phosphates.

Spray deposited aluminum oxide and extruded deposits of clay, boron nitride, and mica were evaluated for contemplated use at 350C and 500C as wire insulation in RF coaxial cable. Silver wire of .012 inch diameter was coated with the dielectrics to an overall thickness of .092 inch. To aid electrical evaluation, the coated wire was covered with a tightly woven fiberglass braid and encased in a snugly fitting aluminum sheath. Such assemblies resembled a coaxial cable.

PB-169 579 **Field 9A, 14D**
CFSTI Price: HC$6.60
Battelle Memorial Inst., Columbus, Ohio.
LABORATORY TEST PROCEDURES FOR PREDICTING THE TROPICAL SERVICE LIFE OF ELECTRONIC COM- PONENTS AND MATERIALS.
Quarterly progress rept. no. 3, 1 Mar-31 May 55,
by K. E. Cochran, D. F. Edwards, N. B. Crane, S. A. Woodruff and C. F. Salt. 30 Jun 55, 70p
Contract DA-36-039-sc-64518
AD 71 454

Descriptors: (*Tropical tests, Electronic equipment), (*Electronic equipment, Tropical tests), Environmental tests, Life expectancy, Capacitors, Test methods, Panama.

During this period, the entire effort was directed toward completing the details necessary for setting up the tropical tests. Delivery of the last of the components (metal-cased capacitor) was received. Construction of the six test enclosures and mounting of all the components was completed. Auxiliary items, such as power supplies and the rectifier tester, were also completed. Preliminary measurements were made on each component, both to get baseline data and to be sure the component was within its specified limits. These measurements also served to check out the instrumentation and test procedures. As a result of these tests, a few changes were made in both test procedures and instrumentation. All of the equipment was carefully packed into six boxes and shipped by air freight to Panama. Contract arrangements for use of the Naval Research Laboratory's tropical site at Coco Solo, Panama Canal Zone, were completed during May. It is expected that the tests will start in Panama early in June. This report also contains as an appendix a bibliography of some of the more important literature references collected early in the project. (Author)

PB-169 642 **Field 9B**
CFSTI Prices: HC$3.60
Astro-Electronics Div., Radio Corp. of America, Princeton, N. J.
A SURVEY OF READING MACHINES.
Technical rept. on project ACSI MATIC.
23 Jul 58, 40p
Contract DA-49-083-OSA-1183
AD 224 899

Descriptors: (*Reading machines, State-of-the-art reviews), Data processing systems, Character recognition.

This report represents the results of a survey of the present state of the art in devices described as document readers, document transcribers, page readers, character recognition devices, or reading machines. In general, the purpose of these devices is to recognize and classify two-dimensional patterns in order to translate graphic material into signals useful as inputs to data processing equipment. The term 'to recognize' implies the ability of the device to extract sufficient information from the pattern so that it may be assigned one of a given number of classifications. In particular the devices of interest are those which are capable of translating printed English characters into a machine language.

PB-169 673 **Field 9B, 12A, 6D**
CFSTI Prices: HC$1.60 MF$0.50
Purdue Univ., Lafayette, Ind.
A STATISTICAL APPROACH TO THE DESIGN OF INTELLIGENT MACHINES. PATTERN RECOGNITION AND LEARNING,
by K. S. Fu. 1962, 16p
Cybernetica (Namur) v5 n2 p88-102 1962.

Descriptors: (*Artificial intelligence, Learning machines), (*Pattern recognition, Learning machines), (*Learning machines, Decision

theory), (*Decision theory, Learning machines), Statistical analysis, Sequential analysis, Design, Cybernetics, Synthesis, Adaptive systems.

A unified approach based on statistical decision theory and sequential analysis is developed in this paper for the synthesis of pattern recognition machines and learning systems.

SLAC-51 **Field 9B, 20G**
CFSTI Prices: HC$2.00 MF$0.50
Stanford Linear Accelerator Center, Stanford Univ., Calif.
POISSON EQUATION SOLVING PROGRAM,
by Wm. B. Herrmannsfeldt. Sep 65, 33p
Contract AT (04-3)-400

Descriptors: (*Digital computers, Programming (Computers)), (*Programming (Computers), Particle accelerators.

Identifiers: Poisson equation.

WAPD-TM-514 **Field 9B, 18I**
CFSTI Prices: HC$2.00 MF$0.50
Westinghouse Power Lab., Pittsburg, Pa.
CYGRO-STRESS ANALYSIS OF THE GROWTH OF CONCENTRIC CYLINDERS,
by C. M. Friedrich. Oct 65, 34p
Contract AT (11-1)-GEN-14

Descriptors: (*Digital computers, Stresses), (*Stresses, Cylindrical bodies).

Identifiers: Cygro.

10. ENERGY CONVERSION (NON-PROPULSIVE)

AD-286 520 **Field 10C, 7D**
CFSTI Prices: HC$10.60
Eagle-Picher Co., Joplin, Mo. Couples Dept.
RESEARCH ON AMMONIA BATTERY SYSTEM.
Final rept., 1 Jul 60-30 Jun 62,
by D. J. Doan, L. R. Wood, E. M. Morse, andJ. F. Dittmann. 30 Jul 62, 105p
Contract DA-36-039-sc-85396,
Proj. DA-3A99-09-001

Descriptors: (*Ammonia, Electrolytic cells), (*Electrolytic cells, Ammonia), (*Batteries + components, Electrolytic cells), Liquefied gases, Electrochemistry.

Minus 54 C activation of multicell units was significantly improved by reduction of current leakage. An increase in energy per unit weight was accomplished through improved hardware design and concentrated cell structure. Cell design was improved to obtain higher energy per unit weight using both mercury sulphate and silver chloride cathodes. No new cathode materials were found better than those presently being used. Initial single cell, low-rate, long-duration discharges were made over about 24 hours, but produced excessive gassing. (Author)

AD-413 795 **Field 10B, 10C**
CFSTI Price: HC$6.60
Union Carbide Consumer Products Co., Parma, Ohio.
LOW TEMPERATURE FUEL CELL BATTERY.
Final rept., 1 Jul 60-28 Feb 61.
28 Feb 61, 69p
Contract DA-36-039-sc-78367,
Task 3A-99-09-002-03
Prepared in cooperation with Electrochemical Product Development Lab., Cleveland, Ohio.

Descriptors: (*Low-temperature batteries, Fuel cells), (*Fuel cells, low-temperature batteries), Carbon, Electrodes, Porous materials, Weight.

To carry on investigations leading to the fabrication of a 28-volt, 200-watt fuel cell battery operating on hydrogen and air with an over-all package weight not to exceed 35 pounds, including mechanical auxiliaries, and fuel for 24 hours' service. A life of 1000 hours was established as the desired service target for the battery. The investigation covered study of fuel sources adapted to meet the service and weight requirement, and means for generation of the fuel gas.

N66-13381 **Field 10B**
CFSTI Prices: HC$5.00 MF$1.00
Westinghouse Electric Corp., Lima, Ohio. Aerospace Electrical Div.
SPACE ELECTRIC POWER SYSTEMS STUDY, VOLUME 4.
Final rept., Nov 61-Dec 62,
by E. R. Procasky. 1963, 154p
Contract NAS5-1234
NASA CR-50861

Descriptors: (*Spacecraft, Power supplies).

N66-13474 **Field 10A**
CFSTI Prices: HC$1.00 MF$0.50
General Electric Co., Schenectady, N. Y. Research and Development Center.
ELECTRODEPOSITED INORGANIC SEPARATORS.
Quarterly rept. no. 2, 15 Jul-15 Oct 65.
1965, 20p
Contract NAS5-9168
NASA CR-68627

Descriptors: (*Storage batteries, Battery separators), Calcium compounds, Magnesium compounds, Hydroxides.

N66-15012 **Field 10A**
CFSTI Prices: HC$4.00 MF$1.00
General Atomic, San Diego, Calif. John Jay Hopkins Lab. for Pure and Applied Science.
RADIATION EFFECTS ON SILICON SOLAR CELLS.
Final rept., 1 Dec 61 - 31 Dec 62,
by J. W. Harrity, H. Horiye, S. W. Kurnick, D. K. Nichols, and D. P. Snowden. 15 Feb 63, 145p
Contract NAS7-91,
Proj. GA-258
NASA CR-69139

Descriptors: (*Solar cells, Silicon), (*Radiation damage, Solar cells), (*Crystal structure, Silicon).

N66-15024 **Field 10A**
CFSTI Prices: HC$2.00 MF$0.50
Allis-Chalmers Mfg. Co., Milwaukee, Wis. Research Div.
RESEARCH AND DEVELOPMENT OF OPEN CYCLE FUEL CELLS.
Quarterly progress rept. no. 2, for 15 Feb 65,
by R. Desai, G. Monette, and C. Williams. 15 Mar 65, 60p
Contract NAS8-5392
NASA CR-69082

Descriptors: (*Fuel cells, Power supplies), (*Power supplies, Moisture), Programming (Computers).

Patent 3,228,801 **Field 10C**
DEFERRED ACTION DRY CELL.
Patent assigned to Army,
by Gilbert R. Snyder. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Dry cells, Patents), Battery separators, Plastics, Alkaline cells, Electrodes, Electrolytes, Storage, Performance (Engineering).

The deferred action dry cell includes two electrodes, one within the other, and an electrolyte between the electrodes. An impervious protective liner surrounds the electrolyte. A pull ring is attached to the liner. The cell is activated by grasping the cell in one hand and the pull ring in the other and pulling the liner out of the cell.

Patent 3,229,124 **Field 10B**
MODIFIED MARX GENERATOR.
Patent assigned to AEC,
by Aldred E. Schofield. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Generators, Voltage), Capacitors, Circuits, Trigger circuits, Discharge tubes.

The circuit is useful in thermonuclear research and is designed for charging capacitors in parallel and discharging them in series. A current is applied to an ignitor circuit sufficient to fire a first ignitron. A clamping circuit is provided between the ignitor of a second ignitron and the cathode of the first. The cathode of the first ignitron is connected to ground. A capacitor is in series connection with the anode of the first ignitron and the cathode of the second so that when the first fires the capacitor discharges to the cathode of the second. The firing of the second ignitron is caused by current drain-off into the clamping circuit.

PB-169 312 **Field 10C, 4B**
CFSTI Prices: HC$2.00 MF$0.50
Melpar, Inc., Falls Church, Va.
DEVELOPMENT AND PROTOTYPE PRODUCTION OF FLEXIBLE THIN FILM BATTERIES.
Final rept., 22 Dec 64-17 Apr 65,
by Richard G. Black. Apr 65, 46p
Contract Cwb-11029

Descriptors: (*Batteries ; components, Films), (*Alkali cells, Films), Meteorological balloons, Power supplies, Design, Production, Anodes (Electrolytic cells), Nickel compounds, Oxides, Deposition, Electrical connectors, Packaging, Battery separators, Acrylonitrile polymers, Polyvinyl chloride, Electrical properties.

Identifiers: GHOST Project, Nickel-cadmium cells, Thin-film batteries.

The report concerns the development of plastic-encased thin film batteries for use as power sources in meteorological ballons which could be safely struck or ingested by aircraft (Project GHOST). A process for producing such batteries which was developed by Harry Diamond Laboratories is discussed. Results of efforts to refine and modify the basic HDL process are reported. The major effort was directed toward the production of nickel oxide positive electrodes. It is shown that it is possible to produce flexible thin film batteries with electrical properties suitable for use in the GHOST program, and that the batteries would maintain performance at low temperatures if low discharge rates are used. Recommendations for future work are included.

11. MATERIALS

AD-270 254 **Field 11B, 11F**
CFSTI Price: HC$4.60
State Univ. of New York, Alfred. Coll. of Ceramics.
THE YOUNG'S MODULUS AND INTERNAL FRICTION OF POLYCRYSTALLINE MgO AT ROOM TEMPERATURE.
First year rept., 1 Sep 60-1 Sep 61,
by Rinoud Hanna and W. B. Crandall. 1 Sep 61, 50p

Grant DA-ORD-31-124-60-G58
AROD 2891:1

Descriptors: (*Ceramic materials, Powder metallurgy), (*Magnesium compounds, Oxides), Particle size, Internal friction, Powders, Elasticity, Porosity.

Hot pressing method was used to prepare polycrystalline MgO from several starting powders, which behaved distinctly from each other. A direct relationship between the activity of the powder and its 'compressibility' was found. As the density of the specimen increased the Young's modulus increased linearly, whereas the internal friction decreased. It was found that the internal friction was inversely proportional to the square of the grain diameter. MgO specimens of the same density, but from different origin may not necessarily have the same Young's modulus or internal friction values; these differences may be attributed to the presence of foreign atoms. (Author)

AD-457 586 **Field 11C**
CFSTI Price: HC$1.00
Naval Civil Engineering Lab., Port Hueneme, Calif.
INFRARED SPECTROSCOPY OF PAINT VEHICLES,
by J. B. Crilly. 25 Feb 65, 12p Technical rept. R-366
Proj. Y-R007-08-03-302

Descriptors: (*Paints, Spectra (Infrared)), (*Infrared spectroscopy, Paints), Test methods, Specifications, Polyester plastics, Plastic coatings.

Infrared spectroscopy was investigated for its application to the specification testing of paint vehicles. Infrared absorbance by paint vehicles was measured using attenuated total reflectance of light by the vehicle and by transmission of solutions of vehicle. Reproducible results were not attained by either approach. Much more study is required to devise a method by which separate laboratories with different equipment could make measurements of adequate precision for inclusion in paint specifications. (Author)

AD-463 034 **Field 11B, 7B**
CFSTI Prices: HC$1.00
Union Carbide Research Inst., Tarrytown, N. Y.
THE DETERMINATION OF BORON IN REFRACTORY BORIDES BY PYROHYDROLYSIS,
by G. J. McKinley and H. F. Wendt. Jan 65, 16p
Technical rept. no. C-28
Contract DA-30-069-ORD-2787

Descriptors: (*Refractory materials, Borides), (*Boron, Chemical analysis), Titanium compounds, Zirconium compounds, Niobium compounds, Tantalum compounds, Pyrolysis, Hydrolysis, Boric acids, Volumetric analysis.

An analytical method was developed for the determination of boron in the refractory borides of titanium, zirconium, niobium and tantalum. Pyrohydrolysis of the refractory boride forms boric acid which is distilled, collected, and titrated by a mannitol-sodium hydroxide procedure. The method is precise and accurate, and its simplicity of operation makes it attractive for use as a routine procedure. (Author)

AD-467 049 **Field 11I, 7D**
CFSTI Prices: HC$2.00 MF$0.50
Naval Ordnance Lab., White Oak, Md. Non-Metallic Materials Div.
A CORRELATION OF POLYMERIC STRUCTURE TO ABLATIVE PROPERTIES.
Technical rept.,
by Gerald J. Fleming. 29 Apr 65, 40p NOLTR 65-50
Task BuWeps-RRMA 03-043-212-1-R007-04-01

Descriptors: (*Ablation, Polymers), (*Polymers, Ablation), (*Epoxy plastics, Ablation), Molecular structure, Models (Simulations), Aging (Materials), Additives, Thermogravimetric analysis, Cross linking (Chemistry), Infrared spectroscopy, Refractory materials, Silicon compounds, Dioxides, Micro structure, Anhydrides.

Identifiers: Ablative materials, Curing agents, Fillers, Methyl bicycloheptene dicarboxylic anhydride, Silicon dioxide.

The work contained in the report encompasses an attempt to correlate the chemical and physical structure of a polymer with its ablative performance. A broad range of epoxy resins and curing agents were employed as model systems. Various tools such as 'alpha rod' testing, thermogravimetric analysis, crosslink density studies, and infra-red spectroscopy were used in making this correlation. The epoxy novolac type resin performed the best of all the epoxy resins in the 'alpha rod' oxy-acetylene torch test while nadic methyl anhydride performed as the best curing agent for epoxy resins under these ablative conditions. The use of a refractory filler such as SiO2 was found to be necessary for good performance. The mechanism through which this filler aids the ablative properties of materials is explained with the help of photomicrographs. (Author)

AD-468 687 **Field 11L, 11G**
CFSTI Prices: HC$1.10 MF$0.50
Naval Civil Engineering Lab., Port Hueneme, Calif.
EXPERIMENTAL WOOD PILING TREATMENTS FY-65.
Technical note,
by Thorndyke Roe, Jr. and Harry Hochman. 5 Aug 65, 8p TN-N-736
Proj. Y-R005-07-01-007

Descriptors: (*Wood, Preservation), Protective treatments, Chemicals, Creosote, Data, Tables, Solutions, Test.

Sixty-six 20-foot piles cut from 40-foot Class B Douglas fir piles were treated with creosote-free preservatives containing combinations of compounds in the NCEL wood treating plant. Twelve piles were treated with two of these solutions to which some creosote was added. Retentions of preservative were determined by weight increase. The treated piles are being exposed at Waipio Point, Pearl Harbor, Hawaii. (Author)

AD-470 526 **Field 11F**
CFSTI Prices: HC$3.60 MF$0.50
Franklin Inst. Research Labs., Philadelphia, Pa.
LIQUID METAL EMBRITTLEMENT.
Interim technical rept.,
by Richard W. Vook. Aug 65, 39p I-B2119-1
Contract Nonr-4225 (00),
Proj. NR-036-056

Descriptors: (*Copper, Embrittlement), (*Corrosive liquids, Bismuth), (*Bismuth, Liquid metals), (*Liquid metals, Embrittlement), Electron microscopy, Compatibility, Grain boundaries, Fracture (Mechanics).

An electron microscope investigation of the embrittlement of copper by liquid bismuth has been carried out. Observations were made above the melting point of bismuth (271C) and at room temperature. A uniform bismuth film was formed by evaporation on a thinned copper foil. When this film melted, it tended to agglomerate (depending on the vacuum conditions and surface preparation prior to deposition) and flow along grain boundaries. The rate of flow increased considerably when a tensile stress was applied. Boundaries in contact with liquid bismuth at temperatures above 271C were brittle. Boundaries exposed to liquid bismuth for several hours and tested at room temperature were brittle also. The intergranular nature of the embrittlement was verified by transmission electron diffraction and electron microscopy. No evidence for dislocation pile-ups acting to initiate brittle fracture was obtained. (Author)

GEMP-53A **Field 11F, 18J, 11B**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
HIGH-TEMPERATURE MATERIALS PROGRAM PROGRESS REPORT NO. 59, PART A.
26 Nov 65, 83p
Contract AT (40-1)-2847

Descriptors: (*Heat-resistant metals + alloys, Reactor fuel elements), (*Reactor materials, Heat-resistant metals + alloys).

GEMP-54A **Field 11F, 18J, 11B**
CFSTI Prices: HC$3.00 MF$0.75
General Electric Co., Cincinnati, Ohio. Nuclear Materials and Propulsion Operation.
HIGH-TEMPERATURE MATERIALS PROGRAM.
Progress rept. no. 54, Part A.
20 Dec 65, 73p
Contract AT (40-1)-2847

Descriptors: (*Heat-resistant metals + alloys, Radiation damage), (*Reactor materials, Heat-resistant metals + alloys).

OTR-136 **Field 11F, 13H**
National Bureau of Standards, Washington, D.C. Inst. for Applied Technology.
TITANIUM ALLOYS.
Feb 66, 23p
Prepared in cooperation with Syracuse Univ. Research Corp., N. Y. Available free from the Clearinghouse.

Descriptors: (*Titanium alloys, Reviews), (*Biblio graphies, Titanium alloys), Titanium, Machining, Mechanical properties, Material forming, Mechanical working, Welding, Bonding, Brazing, Stress corrosion, Cryogenics, Fracture (Mechanics), Abstracts, Reports.

Significant reports covering the period since 1964 were selected for this study, with reference to earlier works. Government sponsored R and D on the properties and fabrication of titanium alloys has been given new impetus because of their broadening application in the military and aerospace programs. Increased knowledge of the alloys has suggested even more uses, particularly new industrial applications. Basic knowledge of complex alloy systems and their properties as well as the technology necessary to fabricate them for specific applications have been appreciably enriched. A synopsis of the library of reports on these subjects available from CFSTI is given. (Author)

Patent 3,228,750 **Field 11F, 7B**
PROCESS FOR SEPARATING RARE-EARTH ELEMENTS BY ION EXCHANGE.
Patent assigned to Interior,
by Roald E. Lindstrom and J. Oscar Winget. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Rare earth elements, Separation), (*Separation, Ion exchange), Patents, Yttrium, Mixtures.

The rare earths are usually obtained from ore concentrates of the oxides. The process involves passing of an aqueous solution of salts of the rare earth metals, such as lanthanum, yttrium and the like, through at least two cation-exchange beds in series and the use of an eluant such as ethylene diamine tetracetic acid.

Patent 3,228,777 **Field 11H, 13H, 11B**
SINGLE APPLICATION LINSEED OIL-IN-WATER EMULSIONS FOR CURING AND/OR PREVENTING SPALLING OF CONCRETE.

Patent assigned to Agriculture,
by William L. Kubie, Sr. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Concrete, Aging (Materials), (*Vegetable oils, Aging (Materials), Colloids, Fracture (Mechanics).

Identifiers: Linseed oil.

The composition crosslinks and dries very rapidly after application to the surface of even soaking-wet, freshly poured concrete or Portland cement. It consists of about 95 parts, by weight, of linseed oil, 1.5 parts of a soap-solubilizing mixture of 2 parts of 4-methoxy-4-methyl-pentanol-2 and 1 part of ethylene glycol, 0.8 part of a base selected from sodium hydroxide, potassium hydroxide, and ammonium hydroxide, and not more than about 0.035 part of dipicolinic acid.

PB-169 445 **Field 11F, 13H, 20B**
CFSTI Prices: HC$1.60 MF$0.50
Royal Aircraft Establishment, Farnborough (England).
THE NUCLEATION AND GROWTH OF S' PRECIPITATES IN AN ALUMINUM-2.5% COPPER-1.2% MAGNESIUM ALLOY,
by R. N. Wilson and P. G. Partridge. Mar 65, 20p Technical rept. no. TR-65050

Descriptors: (*Magnesium alloys, Aging (Materials)), Dispersion hardening, Crystal lattice defects, Crystal structure, Electron microscopy, Nucleation, Aluminum alloys, Copper alloys, Metallography.

The nucleation and growth of S' precipitates in an aluminum - 2.5% copper - 1.2% magnesium alloy aged at 190C have been examined by transmission electron microscopy. The S' precipitates have been shown to be heterogenously nucleated at dislocations, and to grow as laths on (210) planes in a <001> direction. The shape of the laths is consistent with the degree of mismatch of the matrix and precipitate planes at the precipitate-matrix interfaces. Precipitate sheets are formed at dislocations by the growth of the laths on (210) planes with a common <001> growth direction; the growth planes conform to the strain energy requirement that the misfit vector of the precipitate should lie approximately parallel to the Burgers vector of the dislocation, and are those expected from consideration of the effect of the line tension of the dislocation. The possibility of refining the precipitate distribution is discussed, and an increase in the density of sites for heterogeneous nucleation (e.g. by prestrain prior to ageing) or a modification of the interfacial energy (e.g. by addition of silicon) are both shown to result in refinement of the S' precipitate distribution. (Author)

PB-169 491 **Field 11D, 8G**
CFSTI Prices: HC$4.00 MF$1.00
Alabama Univ., University. Dept. of Civil Engineering.
THE DEVELOPMENT OF A NEW METHOD FOR DETERMINING CERTAIN PHYSICAL PROPERTIES OF AGGREGATES WITHOUT USING THE SPECIFIC GRAVITY OF SOLIDS AS A FUNCTION. PHASE I.
Alabama Highway Research rept.,
by C. Howell Mullis, Jr. Jul 64, 141p HPR-10
Sponsored by Alabama Highway Dept. Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Composite materials, Physical properties), (*Soils, Physical properties), Solids, Density, Limestone, Gravel, Gravity, Slags, Test methods, Tests, Asphalt.

Identifiers: Aggregates (Materials).

A process is described by which the volume of voids in an aggregate sample can be measured directly. The principle utilized is that if two of the three soil phase- solids, liquid and gas - can be eliminated, the eliminated phases can be measured when they are re-introduced. In this process the liquid and gaseous phases are eliminated. Liquid is then re-introduced and the liquid volume measured. This volume is the volume of the voids. This theory was subjected to experimental verification and the results compared with results obtained by testing the same aggregate by approved ASTM test procedures. Three types of aggregate were thus compared. These were (a) crushed limestone, (b) river gravel, and (c) blast furnace slag. The crushed limestone and river gravel were representative of conventional aggregates used in Alabama and the blast furnace slag was representative of lightweight aggregate. From a statistical analysis of results, it was found that there was no difference in the results obtained after testing the limestone and gravel. (Author)

PB-169 505 **Field 11B, 11D, 13C**
CFSTI Prices: HC$2.00 MF$0.50
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil Engineering.
PRELIMINARY INVESTIGATION OF THE MECHANICAL BEHAVIOR OF IDEALIZED AGGREGATE-ASPHALT COMPOSITES.
by Anwar E. Z. Wissa. Sep 65, 36p Research rept. R65-41
Prepared in cooperation with Bureau of Public Roads, Washington, D. C. and Commonwealth of Massachusetts, Dept. of Public Works.

Descriptors: (*Concrete, Mechanical properties), (*Composite materials, Mechanical properties), Glass, Spheres, Asphalt, Friction, Viscosity, Shear stresses, Stresses, Strain (Mechanics).

Identifiers: Aggregates (Materials).

Drained triaxial compression tests were run on three sizes of glass beads ranging from 6 mm to 0.278 mm diameter. The results of preliminary tests on both the untreated beads and the beads with 9 percent asphalt by weight show that: (1) Particle size per se has no effect on the strength behavior of these particulate systems at a given dry density. (2) The addition of asphalt to a particulate system consisting of glass beads can appreciably reduce the effective angle of internal friction of the system when the packing of the beads is kept constant. (3) For a constant packing of beads, the effective angle of internal friction increases as the viscosity of the asphalt decreases. At relatively low viscosities the angle of the bead-asphalt systems approaches that of the untreated beads. (4) The addition of asphalt has only a slight effect on increasing the effective cohesion intercept of the systems. This intercept is apparently relatively insensitive to wide changes in asphalt viscosity. (Author)

PB-169 577 **Field 11I, 11C, 6F**
CFSTI Prices: HC$5.60
Alaka Research Labs., Lacquer and Chemical Corp., Brooklyn, N. Y.
FUNGUS RESISTANCE OF PLASTICS.
Quarterly rept. no. 7, 16 Aug-16 Nov 52,
by S. Ruggeri, D. Day, and S. Botkin. 15 Jan 53, 60p
Contract NOrd-11215
AD 22 313

Descriptors: (*Plastics, Fungus deterioration), (*Fungus deterioration, Plastics), (*Test methods, Fungus deterioration), Standards.

PB-169 638 **Field 11L, 11C, 13M**
CFSTI Prices: HC$1.00 MF$0.50
Department of Forestry, Ottawa (Ontario).
WOOD PRESERVATION AROUND THE HOME AND FARM,
by H. P. Sedziak. 1966. 20p DF-1117
Summary in French.

Descriptors: (*Wood, Preservation), (*Fungus deterora tion, Wood), (*Protective treatments, Wood), Degradation, Fungus proofing, Insects, Moisture, Fires, Buildings, Finishes and Finishing.

Since many home owners and farmers have a large equity in wood in the form of buildings, structures, or wooden articles in their possession or care, any undue deterioration of the wood could be a serious financial loss. Most people are not aware of how deterioration of wood can come about or how it can be prevented. This publication describes the principal agencies of wood deterioration -- namely, wood-destroying fungi, fire, and wood-boring insects -- and their control. Destruction of wood by marine organisms is not discussed. The nature of fungal decay and the conditions causing decay in wood are examined in detail. Certain requirements must be met before fungi can grow vigorously and destroy wood. One of the requirements is a proper range of moisture content in the wood. To keep wood at a moisture content below that at which fungi can grow is the basic principle of good building practice. A close study is made of site, foundation, roof, framing, windows, verandas and steps of a house to determine where the principles of good building practice can be incorporated or improved. Other factors that control fungal growth, namely, ambient temperature, air supply, or presence of toxic substances, are described. The effect of various methods of preservative treatment of wood is discussed. Included is a short description of methods of protecting wood from attack by fire or wood-destroying insects. (Author)

12. MATHEMATICAL SCIENCES

N66-13400 **Field 12A**
CFSTI Prices: HC$1.00 MF$0.50
Iowa State Univ. of Science and Technology, Ames.
A HYPERGEOMETRIC MEAN VALUE,
by B. C. Carlson. 1963, 10p
Grant NsG-293
NASA CR-56922

Descriptors: (*Special functions (Mathematical), Analysis).

ORNL-3694 **Field 12A**
CFSTI Prices: HC$3.00 MF$0.50
Oak Ridge National Lab., Tenn.
CONCERNING THE MOMENT PROBLEM.
Doctoral thesis,
by G. G. Johnson. Dec 65, 42p
Contract W-7405-eng-26

Descriptors: (*Functional analysis, Sequences), (*Polynomials, Integrals).

Identifiers: Moment problem.

13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING

AD-406 832 **Field 13H, 11F**
CFSTI Price: HC$2.60
General Electric Co., Philadelphia, Pa. Missile and Space Div.
INVESTIGATION OF BONDING IN OXIDE-FIBER (WHISKER) REINFORCED METALS.
Quarterly rept. no. 1, 1 Jul-30 Sep 62,
by Willard H. Sutton. Nov 62, 27p
Contract DA-36-034-ORD-3768RD.
Proj. DA-59332008
AMRA CR-63-01/1

Descriptors: (*Ceramic fibers, Bonding), (*Bonding, Ceramic fibers), (*Reinforcing materials, Ceramic fibers), Whiskers (Crystals), Single crystals, Oxides, Aluminum compounds, Nickel, Surface properties, Metallurgy.

One of the critical problems in achieving high strength composites by reinforcing metals with oriented single-crystal fibers (whiskers) is the strength of the interfacial bond between the two phases. The purpose of this program, therefore, is to investigate the factors affecting interfacial bonding so that appropriate bonding techniques can be specified for the fabrication of high strength composites. This report describes the problem areas and the experimental procedures to be used in the investigation. In order to study and evaluate the effects of various parameters affecting interfacial energies and bond strength, a sessile drop apparatus is being constructed. Future plans utilizing this equipment in conjunction with actual measurements of bond strengths are discussed. (Author)

AD-427 219 **Field 13H, 9C**
CFSTI Prices: HC$2.00 MF$0.50
General Electric Co., Syracuse, N. Y. Materials and Processes Lab.
SOLDERABILITY OF TERMINALS AND AGING.
Quarterly progress rept. no. 4, 1 Jul-30 Sep 63,
by J. A. De Vore. 30 Sep 63, 26p
Contract DA-36-039-AMC-00008 (E),
Task DA-702

Descriptors: (*Electric terminals, Soldering), (*Plating, Electric terminals), (*Soldering, Electric terminals), (*Aging (Materials), Electric terminals), Tin coatings, Gold, Nickel, Copper coatings, Wire, Brass, Copper, Nickel alloys, Iron alloys, Test methods.

The objective of this project is to develop test methods for the solderability of lugs, tabs, stranded wire, etc., and to develop a simulated short time aging test to duplicate 6 or 12 months natural aging of wires, lugs, etc. which are to be soldered. This quarterly report discusses the evaluation of the six months natural aging samples and a second evaluation of the previously reported steam aging method. Also discussed are data collected on wire wrap method and MIL-STD-202B, Method 208, selected last quarter as the two best available solderability test methods to date. (Author)

AD-465 120 **Field 13D, 9L**
CFSTI Prices: HC$10.60 MF$0.75
Twin Industries Corp., Sayre, Pa. Special Products Div.
SHELTER ELECTRICAL EQUIPMENT S-318 ()/G.
Rept. no. 13 (final), 15 Jun 62-30 Sep 64,
by Edmund R. Moore. 30 Sep 64, 107p
Contract DA-36-039-sc-90814 (E),
Task DA-1Eb-34301-D-24606
N65 29909

Descriptors: (*Shelters, Design), (*Electrical equipment, Shelters), Portable, Design, Structures, Transportation, Stresses, Construction, Sandwich panels, Foams, Spot welds, Weight, Handling, Drop testing, Quality control, Tests.

AD-466 552 **Field 13J**
CFSTI Prices: HC$3.60 MF$0.50
Davidson Lab., Stevens Inst. of Tech., Hoboken, N. J.
RESISTANCE AND SEAKEEPING PERFORMANCE OF NEW HIGH SPEED DESTROYER DESIGNS.
Final rept.,
by John P. Breslin and King S. Eng. Jun 65, 36p
Rept. no. 1082
Contract Nonr-263 (10),
Proj. DL-2738/060

Descriptors: (*Destroyers, Performance (Engineering)), Design, Ship hulls, Hydrodynamics, Friction, Ocean waves, Theory, Ship models, Ship structural components, Measurement, Pitch (Motion), Roll, Stability, Configuration.

Results of calm water resistance tests for two new destroyer designs are compared with data for the DD692 Class (long hull). Heave and pitch measurements in three wave lengths, which are reported for the better of the two new designs, show its marked superiority over 692 in all but the very low speed range. A check of the roll characteristics shows that the gain in seakeeping performance is obtained at small sacrifice in roll stability which may be overcome by design refinement. It is concluded that this brief study has evolved a highly practical destroyer form which has markedly reduced heave and pitch with some increase in resistance at low speeds and a reduction in resistance at high speed. This form, which merits consideration for additional study, holds greater seakeeping potential for ASW missions than any other advanced surface-ship concept previously studied. (Author)

AD-466 805 **Field 13H**
CFSTI Prices: HC$3.00 MF$0.75
Battelle Memorial Inst., Columbus, Ohio
INTERPRETATIVE REPORT ON WELD-METAL TOUGHNESS.
Final rept.,
by K. Masubuchi, R. E. Monroe, and D. C. Martin.
Jul 65, 86p
Contract NObs-90504,
Proj. SR-170
SSC 169
Prepared in cooperation with National Academy of Sciences-National Research Council, Washington, D. C.

Descriptors: (*Notch toughness, Welds), (*Welds, Notch toughness), (*Steel, Welds), Welding, Test methods, Arc welding, State-of-the-art reviews.

A literature survey was made to review presently available information on the notch toughness of weld metals and the heat-affected zone as they are affected by welding procedures. The base metals discussed in this report include mild steel and low-alloy, high-strength steels with up to 120,000-psi yield strength, such as may be used for merchant-ship construction. Welding processes considered include (1) shielded metal-arc welding, (2) submerged-arc welding, (3) gas metal-arc welding, and (4) electroslag and electrogas welding. One of the most important observations of this literature survey is that relatively limited information is available on the notch toughness of weld metals and heat-affected zones which can be used to establish behavior trends. Information is especially lacking on what constitutes realistic requirements for notch toughness in these zones compared with that of the base metal. It was also observed that relatively little correlation of such factors as chemical composition, microstructure, and welding variables has been made with the notch toughness of weld metals and heat-affected zones. (Author)

AD-468 485 **Field 13H, 9A**
CFSTI Prices: HC$12.60 MF$1.00
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
GENERATION OF CONTROLLED CURRENT PULSES FOR WELDING APPLICATIONS.
Technical memo.,
by Algimantas A. Dargis, J. Barry Oakes, and Everett D. Alton. May 65, 96p TG-701
Contract NOw-62-0604-c

Descriptors: (*Welding, Circuits), (*Circuits, Welding), Machine tools, Power supplies, Transistors, Rectifiers, Silicon, Electromagnetic pulses.

This report describes the engineering considerations of work performed to improve circuit welding machines. A truck-battery powered welding machine design which uses saturated transistors as switches for currents in the 1000 ampere range is analyzed mathematically and investigated experimentally. Also described is another welder which uses unsaturated transistors to switch and regulate the weld current. A third welder design investigated uses silicon-controlled rectifiers as switches in the secondary of a welding transformer. A waveform generator which can accurately modulate the weld current, and a circuit which enables five welders to operate from one set of batteries are also discussed. (Author)

N66-13404 **Field 13H**
CFSTI Prices: HC$1.00 MF$0.50
Boeing Co., Seattle, Wash.
FABRICATION OF LIGHTWEIGHT PARABOLIC CONCENTRATORS FROM A GLASS MASTER.
Final rept.,
by R. B. Gillette and H. E. Snyder. 12 Sep 63, 20p D2-20150-1
Contract NAS7-165
NASA CR-51732

Descriptors: (*Solar radiation, Collecting methods), Glass, Epoxy plastics.

Patent 3,228,332 **Field 13E, 13J**
UNDERWATER RELEASE MECHANISM.
Patent assigned to Navy,
by Roger F. Snyder. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Release mechanisms, Underwater equipment), Patents, Impack shock.

The mechanism is for the release of a buoyant experimental capsule containing scientific measuring instruments which is weighted by an anchor and dropped into a depth of water. The weighted capsule slowly sinks while automatically recording temperature, pressure, and other data. A spring actuated device releases the capsule when the package strikes the bottom. A water-soluble tablet acts as a second release device if the impact release mechanism fails.

Patent 3,228,385 **Field 13G**
PNEUMATIC ENERGY CARTRIDGE.
Patent assigned to Navy,
by Carl A. Damm and Ralph L. McGiboney. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Pneumatic devices, Ejection), Pneumatic systems, Patents, Airborne, Maintainence, Energy.

The pneumatic energy cell has the ability to recharge itself at a leisurely rate through mechanical actuation by a very small electric motor or by manual operation. The pneumatic ejector has an expandable metal bellows. It is mounted on a helicopter and is used to eject a torpedo from a helicopter.

Patent 3,228,410 **Field 13G**
FLUID PULSE WIDTH MODULATION.
Patent assigned to Army,
by Raymond W. Warren and Elmer L. Swartz. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Fluid amplifiers, Pulse modulation), Patents, Digital systems, Signals.

The fluid oscillator establishes a fixed frequency of oscillation of a digital pulse output element such as a bistable fluid amplifier, and combines fluid analog input signals with the oscillator signals to produce pulse width modulation of the digital output. Capacitive properties of the system are utilized to effect a usable presentation of the analog signals. The fluid elements of this invention are constructed in layers etched out, drilled out or otherwise formed to provide appropriate channels which are sealed from the outside except at the inputs and outputs. The material may be of plastic,

such as Lucite, or metal, such as aluminum or brass or any other material which is compatible in strength and chemistry with the fluid flowing through the channels. This fluid can be air, water, acid, and the like.

Patent 3,228,477 **Field 13J**
MARINE PROPELLER ASSEMBLY.
Patent assigned to Navy,
by John P. Breslin. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Propellers (Marine), Fluid dynamic properties), Patents, Propeller hubs, Hydrodynamic configurations.

The marine propeller has a hub and a plurality of radially extending blades. Each blade is provided with an aileron for use in altering the camber of the blade as it cuts a circular path through the water. The device minimizes ship propeller vibratory thrust, torque, and side forces.

Patent 3,228,492 **Field 13M**
DOUBLE-ACTING SHOCK ABSORBER.
Patent assigned to NASA,
by Josef Frarer Blumrich. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Vibration isolators, Impact shock), Patents, Deformation, Mechanical engineering, Honeycomb cores, Foams.

The device utilizes a crushable energy dissipating material which is especially adapted for use as a shock absorber in the landing gear system of a vehicle designed to land on a planet or satellite. The space vehicle has four main struts and bracing struts. The shock absorber could be used to dissipate unusual impacts on automobile bumpers. It can also be used on car stoppers at the end of railway spur lines.

Patent 3,228,547 **Field 13F**
HEAVY EQUIPMENT TRANSPORTERS.
Patent assigned to Army,
by John E. Coordes. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Cargo vehicles, Tracked vehicles), Patents, Handling.

The transporter is especially designed for transporting tracked vehicles but can be used to transport vehicles of all types and general cargo. The structure is such that vehicles may be loaded without the necessity of stabilizing jacks. The tracked vehicles are loaded without the use of auxiliary ramps.

Patent 3,228,550 **Field 13J, 11D**
COMPOSITE PRESSURE VESSEL.
Patent assigned to Navy,
by Martin A. Krenzke. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Pressure vessels, Composite materials), (*Submarine hulls, Composite materials), (*Composite materials, Submarine hulls), Patents.

The hollow composite pressure vessel structure may be used in the forming of a submarine hull. The pressure vessel is a composite hollow body composed of an inner hollow body constituted of a plurality of physically unattached blocks abutting each other and held in place solely by a jacket surrounding the blocks and placed in a state of residual tension.

Patent 3,228,638 **Field 13M, 13I**
MACHINERY FOUNDATION AND METHOD OF ASSEMBLING.
Patent assigned to Navy,
by William J. Burch. 11 Jan 65,
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Vibration isolators, Machines), Patents, Foundation (Structures), Shipborne, Damping, Visco elasticity, Epoxy plastics, Lead.

The machinery is used for supporting machinery on a ship's deck. It dampens and isolates machinery vibrations while protecting the machinery from shock forces emanating from the foundation upon which the support stands via a single structure and to provide an optimum method of assembling the support. A body of damping and isolating material is placed between the material and the foundation. The damping material is composed of a two-part, self-setting, room temperature curing, visco-elastic compound sich as an epoxy-lead filled resin.

Patent 3,228,808 **Field 13H, 11F**
TOUCHENING HIGH STRENGTH STEEL BY WARM WORKING.
Patent assigned to Army,
by Edward J. Ripling and Richard S. Lindberg. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Steel, Mechanical working), (*Mechanical working, Steel), Toughness, Armor plate, Manganese alloys, Molybdenum alloys, Tempering, Hardness, Temperature, Hob working.

The manganese-molybdenum alloy armor plate steel has a high combination of hardness and toughness. The steel is useful in making aircraft landing gears and ordnance parts such as armor plate steels. The steel contains, by weight, of carbon 0.30 percent maximum, manganese 1.7 percent maximum and molybdenum 0.6 percent maximum. The process involves austenitizing, tempering and warm working steps.

Patent 3,229,028 **Field 13E, 13J**
COUPLING BETWEEN A TOW LINE AND OBJECT TOWED.
Patent assigned to Navy,
by John J. Rapuzzi and Robert J. Wolfe. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Couplings, Towing cables), Towed bodies, Underwater equipment, Electric cables, Electric connectors.

The coupling is utilized between a tow line and a 'fish' being towed by a ship in submerged condition. The 'fish' contains scientific apparatus such as sonar equipment and is connected electrically to the ship by conductors incorporated in the tow cable. The coupling may be used with either of the two different noses on the 'fishes' used by the U. S. Navy by use of different fittings.

Patent 3,229,099 **Field 13I**
ELECTRO-OPTICAL ALIGNMENT CONTROL SYSTEM.
Patent assigned to NASA,
by Robert J. Schwinghamer and John R. Rasquin. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Machine tools, Alignment), Tanks (Containers), Cylindrical bodies, Machining, Optical equipment, Control systems.

The system involves the movement of a milling, or other tools, along the circumference of a large-diameter tank-section in order to accommodate the tremendous relative travel involved, often in excess of 150 feet, during milling operations on extremely large space vehicles. The electro-optical system maintains a two-axis alignment between the tool and tool guide. The apparatus insures 'squared' end surfaces of tank sections which are welded together to principally form the body of a space vehicle.

Patent 3,229,155 **Field 13A, 14B**
ELECTRIC ARC DEVICE FOR HEATING GASES.
Patent assigned to NASA,
by William C. A. Carlson and Carl E. Sorensen. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Heaters, Electric arcs), Patents, Gases, Plasma medium, Wind tunnels, Magnetic fields, High-temperature research.

The device is for heating gases or plasma to temperatures of from 10,000 to 50,000 degrees K. The gases are used in a wind tunnel. The gases are heated as they pass through the region of an electric arc struck between two or more electrodes. A magnetic field is generated at each electrode by a solenoid coil having an axis parallel to the direction of arc discharge from the electrode. The resulting magnetic field has a major vector component which is parallel to the electric field gradient at the electrode surface and which has been found to produce a diffuse or multiple spot arc so that even instantaneously the power in the arc is more uniformly distributed over a large electrode area than is the case with the conventional single spot arc.

Patent 3,235,927 **Field 13E**
CATENARY CABLE LINK.
Patent assigned to Army,
by John S. Brown. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Disconnect fittings, Cables (Mechanical)), Patents, Hooks, Anchors (Structural).

The coupling device is for connecting and disconnecting a catenary cable of an air-supported shelter with respect to a fixed anchor hook. The device is a rigid, generally D-shaped ring-like member formed of cast steel. It has four sides. A T-shaped tongue is formed integrally with one side of the device and extends inwardly of the ring-shaped member.

Patent 3,236, 923 **Field 13H, 11C, 18H**
GRAFT POLYMERIZATION OF AN ORGANOSILOXANE COATING ON LEATHER BY IONIZING RADIATION.
Patent assigned to Arrrmy,
by Edward F. Degering. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Plastic coating, Bonding), (*Bonding, Radiation damage), Polymerization, Leather, Organic coatings, Siloxanes, Silicone plastics, Patents.

Comminuted leather is impregnated with a polymerizable organosiloxane and the comminuted leather is pressed into sheet form. The sheet of leather is then exposed to repeated doses of ionizing radiation until the organosiloxane is grafted onto the leather.

Patent 3,236,122 **Field 13I**
DAMPED POWER DRIVE.
Patent assigned to Army,
by George A. Biernson. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Drives, Damping), Power, Patents, Gears, Servomechanisms.

The geared power mechanism is for actuating servomechanisms. The lash-free gearing mechanism

includes two coaxially mounted motors, each having a double-ended shaft. A damper is connected to the motor shafts which extend between the motors. A shaft is provided for mounting a controlled member. Two gear trains are connected between the controlled member shaft and the ends of the motor shafts. Clutches and flywheels are positioned, one each, at the ends of the shafts.

Patent 3,236,153 **Field 13G, 19G**
HYDRAULIC DAMPING MECHANISM FOR A MOUNT.
Patent assigned to Army,
by Fred N. Newcomb. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Rocket launchers, Damping), (*Hydraulic systems, Damping), Patents.

The hydraulic damping mechanism is used in mounts for rocket launchers, cameras and the like. The mount automatically and instantly reduces torque when rapid rotation of the mount is required by the operator. It automatically switches back to the original setting when the motion is reduced in velocity.

Patent 3,236,550 **Field 13E**
DISCONNECT COUPLING.
Patent assigned to Army,
by Clarence W. Falkler. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Disconnect fittings, Couplings), (*Couplings, Disconnect fittings), Patents, Conveyors.

The device is for connecting together the free ends of two sections of a portable conveyor of the type adapted to be used by military personnel in unloading goods from various types of transports. The coupling can be used without tools by personnel using heavy gloves. Interengaging elements align the sections and latch them together.

Patent 3,236,584 **Field 13H, 11C, 18H**
GRAFT POLYMERIZATION ON A PAPER BASE BY IONIZING RADIATION.
Patent assigned to Army,
by Edward F. Degering. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Plastic coatings, Bonding), (*Bonding, Radiation damage), Polymerization, Paper, Patents, Vinyl plastics.

A polymeric coating is grafted on the cellulose molecules of paper by coating the paper with a monomer having a polymerizable vinyl group and subjecting the monomer to repeated exposures to controlled small doses of ionizing radiation.

Patent 3,236,634 **Field 13H, 11F**
PROCESS FOR PRODUCTION OF HIGH SURFACE AREA TUNGSTEN AND TUNGSTEN TRIOXIDE POWDERS.
Patent assigned to AEC,
by Foraker Lambdin, Jr., and Lawrence R. Phillips. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Powder metals, Tungsten), (*Powders, Ceramic materials), Patents, Production, Tungsten compounds, Oxides, Powder metallurgy, Particle size.

The non-pyrophoric tungsten powder consists of an agglomeration of tungsten crystallites. The mean particle size ranges from about 0.08 to 0.013 micron. The process includes reaction of a reactant stream of an aqueous solution of ammonium tungstate with a reactant stream of nitric acid and heating and drying the tungstic acid to remove water and convert the tungstic acid to tungsten trioxide.

Patent 3,236,682 **Field 13D, 11C**
PROCESS FOR PREPARATION OF CAUSTIC-RESISTANT CONTAINERS FOR HIGH-TEMPERATURE USE.
Patent assigned to Interior,
by Lee N. Ballard and Willis A. Calhoun. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Containers, Corrosion inhibition), Nickel, Coatings, Refractory coatings, Preparation, Crucibles.

The crucible or reaction vessel is for use in the reaction of caustic materials with ores, minerals or other metallurgical materials at high temperatures. A nickel vessel is coated with an aqueous slurry of a mixture of ferric oxide in a major amount, an alkaline earth metal oxide and an alkali metal hydroxide. The coated vessel is then dried and calcined to form a caustic resistant coating.

PB-169 089 **Field 13H**
CFSTI Prices: HC$3.00 MF$0.50
Forest Products Lab., Madison, Wis.
SAWING TO REDUCE WARP OF LOBLOLLY PINE STUDS.
Research paper,
by Hiram Hallock. Dec 65, 55p FPL-51

Descriptors: (*Studs, Processing), Wood, Manufacturing methods, Saws, Trees, Distortion, Acceptability, Compressive properties, Mathematical analysis.

Identifiers: Warp, Sawing.

A study was made to evaluate the relation of sawing methods, log diameter, juvenile core diameter, log position in the tree, presence of compression wood, log eccentricity, and position of the stud in the log to warp in 2 by 4 studs sawn from small loblolly pine logs. (Author)

PB-169 090 **Field 13L, 11C**
CFSTI Prices: HC$2.00 MF$0.50
Forest Products Lab., Madison, Wis.
EFFECT OF WALL LININGS ON FIRE PERFORMANCE WITHIN A PARTIALLY VENTILATED CORRIDOR.
Research paper,
by E. L. Schaffer and H. W. Eickner. Dec 65, 31p FPL-49
Prepared in cooperation with the American Hardboard Association, Chicago, Ill.

Descriptors: (*Walls, Fire safety), (*Fire safety, Walls), Buildings, Fires, Ventilation, Wood, Surfaces, Coatings, Combustion, Gases, Flame propagation, Tests, Tables.

Identifiers: Corridors, Fire spread.

Research was conducted to determine the effect of three types of wall linings on fire performance within a partially ventilated corridor. Separate fire exposure studies were made with: (1) essentially noncombustible corridor wall and ceiling surfaces, except for wood doors and trim, and a wood wainscot 3-1/2 feet high; (2) wood-grained, prefinished hardboard applied to both wall surfaces; and (3) Select grade, red oak flooring applied to both walls of the corridor. Under the test conditions, the burning of the wood fire cribs could exhaust the supply of air in the immediate vicinity of the cribs within 6 or 7 minutes, resulting in a flashover along the entire length of the corridor ceiling, as the hot, unburned combustible gases progressively reached an unused supply of oxygen. This flashover occurred at approximately the same time whether the wall linings were of combustible or noncombustible material and occurred before any appreciable flame spread along the wall lining. (Author)

PB-169 308 **Field 13F, 5E**
CFSTI Prices: HC$1.00 MF$0.50
Human Engineering Labs., Aberdeen Proving Ground, Md.
HUMAN ENGINEERING EVALUATION OF TRUCK 1/4 TON, 4 x 4, UTILITY, M38A1,
by Jerry R. Hollis. Mar 55, 20p Technical memo. TM-12
Proj. TB1-1000-5
AD 63 049

Descriptors: (*Human engineering, Cargo vehicles), (*Cargo vehicles, Human engineering), Vehicles, Operators (Personnel), Performance (Human), Safety, Seats, Vehicles accessories, Vehicles instruments, Design.

Identifiers: M-38 trucks (1/4-ton).

The report is an investigation of human factors in the design and operation of the M38A1 1/4 ton, 4x4 truck ('Jeep'). Its purpose is to discuss some design factors which may affect operator efficiency. It is also an initial attempt to develop methods for evaluating Ordnance materiel of this type and to determine how closely this vehicle conforms to available human engineering criteria in the following areas: (1) fixed limits of working space; (2) human sizing as related to fixed limits of working space; (3) operator and passenger seat; (4) safety. (Author)

PB-169 383 **Field 13B, 7A**
CFSTI Prices: HC$2.00 MF$0.50
Pittsburgh Chemical Co., Pa.
FEASIBILITY OF GRANULAR, ACTIVATED-CARBON ADSORPTION FOR WASTE-WATER RENOVATION. 2.
Rept. for 3 Jul 62-1 Jul 63, 26 Jun 63-30 Jun 64,
by R. S. Joyce and V. A. Sukenik. Oct 65, 44p

Grants PHS-PH-86-62-15, PHS-PH-86-63-243
PHS Pub-999-WP-28,
AWTR 15
Rept. on Environmental Health Series. Water Supply and Pollution Control. See also PB-169 838.

Descriptors: (*Wastes (Sanitary engineering), Processing), (*Water supplies, Processing), (*Carbon, Wastes (Sanitary engineering)), Adsorption, Feasibility studies, Thermodynamics, Fluid filters, Chemical analysis.

Granular, activated carbon in packed-bed column contactors 20 feet deep and operated at a flow rate of 4 gpm per square foot reduced the COD to an average value of 18.5 ppm. The removal was not significantly different from the removal obtained when operating the same column at 10 gpm per square foot. After 4 months of operation, the first quarter of the column length was still accomplishing a significant part of the overall removal. Typical adsorption isotherms for type SGL carbon for COD indicated capacities of approximately 35 percent by weight. The cyclic saturation and regeneration of activated carbon through 16 cycles had an average carbon loss of 4.6 percent per cycle. A practical adsorption capacity was maintained for the regenerated carbon even though reactivation conditions for carbon spent on municipal waste-water treatment purification have not been explored and optimized. Flocculation with alum of secondary effluent prior to carbon adsorption increased the adsorption capacity of the carbon and resulted in much lower final levels of COD than the levels obtained with unflocculated effluent. (Author)

PB-169 418 **Field 13B, 11B**
CFSTI Prices: HC$2.00 MF$0.50
Pittsburgh Univ., Pa. Dept. of Civil Engineering.
MOVING LOAD TEST ON EXPERIMENTAL PRESTRESSED CONCRETE HIGHWAY SLAB. PART B. ADDITIONAL INVESTIGATIONS,
by John R. Smith and James L. Evanko. Nov 65, 42p
Prepared in cooperation with Pennsylvania Department of Highways and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Reinforced concrete, Pavements), (*Loading (Mechanics), Reinforced concrete), (*Pavements, Reinforced concrete), Corrosion, Reinforcing materials, Stresses, Bonding, Fracture (Mechanics), Performance (Engineering), Tests, Strain (Mechanics).

Identifiers: Prestressed concrete.

An investigation was made to determine the loss in prestress in the experimental prestressed concrete highway slab, to determine the extent to which bonding of the strands had been accomplished during the grouting operation and to investigate the effects of corrosion on the strands. The investigation was performed about eight years after the pavement was constructed and two years after it was subjected to the moving load tests. Longitudinal cracks had developed over some of the tendons as a result of the moving load tests. Two of these cracks were in the area covered by the present investigation. The test indicated that there was a loss in prestress in the pavement of about 14 percent. Bond failure occurred between the conduit and the pavement when longitudinal cracks along the conduit were forced open. The developed bond strength between the strands and the grout was about 421 psi. Corrosion covered approximately 30 percent of the surface area of the strands. The average breaking strength of the strands was about 27,200 pounds. The investigation demonstrated that there was adequate bond developed between the grouted tendons and the concrete to transfer the prestressing loads when transverse cuts are made.

PB-169 463 **Field 13B**
CFSTI Prices: HC$4.60 MF$0.50
Illinois State Div. of Highways.
AASHO ROAD TEST EQUATIONS APPLIED TO THE DESIGN OF PORTLAND CEMENT CONCRETE PAVEMENTS IN ILLINOIS.
Research study,
by W. Emmitt Chastain, Sr., J. A. Beanblossom, andW. E. Chastain, Jr. Oct 64, 44p

Descriptors: (*Pavements, Illinois), (*Roads, Test methods), Cements, Concrete.

The paper presents and describes the development of a procedure for applying the results of the Road Test rigid pavement research. The procedure provides a means for determining the types and thicknesses of concrete slab such that, on the average, the pavement will be capable of carrying a specific volume and composition of mixed truck and passenger car traffic for a designated period of time and, at the same time, retain a level of serviceability at or above a designated minimum. The AASHO (American Association of State Highway Officials) Road Test rigid pavement performance equation serves as the basis of this design procedure.

PB-169 464 **Field 13B**
CFSTI Prices: HC$5.60 MF$0.50
Illinois State Div. of Highways.
AASHO ROAD TEST EQUATIONS APPLIED TO THE DESIGN OF BITUMINOUS PAVEMENTS IN ILLINOIS.
Research study,
by W. Emmitt Chastain, Sr. and Donald R. Schwartz. Oct 64, 57p

Descriptors: (*Pavements, Illinois), (*Roads, Test methods), Bituminous coatings, Asphalt, Tar.

The paper is concerned with the work done in applying the findings of the Road Test flexible pavement research. It presents background information and concepts used in developing the design procedure, describes the development of the procedure, and demonstrates its application. The procedure provides for establishing the types and thicknesses of materials to be used in the various layers of the pavement structure consistent with the volume and composition of traffic, the length of time the pavement is to serve this traffic, the strength characteristics of the subgrade soils and pavement materials, and the minimum level of service to be provided by the pavement during its lifetime. The AASHO (American Association of State Highway Officials) Road Test flexible pavement performance equation ('The AASHO Road Test Report Five, Pavement Research'. Highway Research Board Special Report 61E (1962)) serves as the basis of this design procedure. (Author)

PB-169 466 **Field 13B, 2D**
CFSTI Prices: HC$5.60 MF$0.75
New Mexico State Univ., University Park. Engineering Experiment Station.
ROADSIDE DEVELOPMENT,
by W. A. Dick-Peddie and C. J. Campbell. Jul 65, 57p Bull-31

Descriptors: (*Roads, New Mexico), (*Plants (Botany), Erosion), (*Erosion, Roads), Deserts, Grasses, Trees, Fertilizers.

Important aspects of vegetation establishment on roadsides in arid (average annual rainfall -- 8.5 in.) New Mexico were investigated in this four year study. Grasses, mulches, fertilization, plant propagation, tree and shrub planting technique and erosion studies were included in the project. Of 24 species of grasses tested under nursery conditions only 5 were selected for planting on the roadside. Of these, only two species of lovegrass indicated adaptability for the roadside environment. Because of limited availability of water no signifiant increases in growth were produced as a result of nitrogen applications. Desert Willow (Chilopsis linearis) and Apache Plum (Fallugia paradoxa) are native species that grew comparatively well under roadside conditions and showed adaptability for erosion control purposes. Transplanting plants from areas adjacent to the right-of-way was a disappointing operation. Arid conditions result in extensive root-systems that cannot be successfully mowed by conventional methods. It was found that untreated cuttings taken from dorment plants of native species in November rooted well. The limited availability of nursery grown stock of many native species should no longer be a major problem. Medium size gravel served as an effective mulch, providing excellent moisture retention and protection against erosion. (Author)

PB-169 467 **Field 13B, 13C**
CFSTI Prices: HC$6.60 MF$0.75
Texas Highway Dept., Austin.
DETERMINING THE RELATIONSHIP OF VARIABLES IN DEFLECTION OF CONTINUOUSLY REINFORCED CONCRETE PAVEMENT.
Technical rept.,
by B. F. McCullough and Harvey Treybig. Aug 65, 67p RR-46-4
Proj. 1-8-63-46

Descriptors: (*Pavements, Reinforced concrete), (*Reinforced concrete, Pavements), (*Deflection, Pavements), Equations, Roads, Loading (Mechanics), Temperature, Thickness, Fracture (Mechanics), Texas, Test methods.

This report presents the development of an empirical equation for determining the load deflection of continuously reinforced concrete pavement for any given set of conditions. The equation was developed by modifying the AASHO Road Test equation for the prediction of load deflections at the free edge of jointed concrete pavements. The variables of crack width and crack spacing, which are unique to continuously reinforced concrete pavement, and soil support were added to the AASHO Road Test equation.

PB-169 485 **Field 13B, 8G**
CFSTI Prices: HC$6.00 MF$1.25
Kansas State Highway Commission.
MATERIALS INVENTORY OF ELLIS COUNTY, KANSAS.
Materials inventory rept. no. 1,
by Alvis H. Stallared, Dale P. Mahan, andDale R. Johnson. 1963, 238p
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Kansas), (*Rock (Geology), Construction), Materials, Structural geology, Sand, Gravel, Silt, Water supplies.

In Ellis County, construction materials can be produced from unconsolidated terrace deposits of Pleistocene age, the Ogallala Formation of Tertiary age, and the Fort Hays Limestone of Cretaceous age. The best quality construction material available in Ellis County is produced from the Meade Formation. Material produced from this unit is suitable for most phases of road construction, i.e., concrete, bituminous and light type surfacing aggregates. Some mineral filler may also be produced from this source unit. The Sanborn Formation provides a source of limestone gravel often used for the surfacing of rural roads. Deposits included in this map unit form high terraces along the Smoky Hill and Saline Rivers. Siliceous sand and gravel are produced from terraces of Wisconsinan age found in the flood plain of the Smoky Hill River; however, significant deposits of this age are not present along the Saline River. Fine siliceous sand and limestone gravel can be produced from the Recent deposits along the Saline and Smoky Hill Rivers. (Author)

PB-169 486 **Field 13B, 2B, 5K, 5J**
CFSTI Prices: HC$2.00 MF$0.50
Pennsylvania State Univ., University Park. Inst. for Research on Land and Water Resources.
FARMS AND NEW HIGHWAYS: PROBLEMS AND ADJUSTMENTS,
by Melvin B. Rockey and John C. Frey. 1964, 33p Research rept. no. 1
Prepared in cooperation with Pennsylvania State Dept. of Highways and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Rural areas, Roads), (*Roads, Government procurement), (*Sociology, Rural areas), Agriculture, Pennsylvania, Adjustment (Psychology), Construction, Public opinion, Economics.

The purpose of this study was to learn how farmers adjust when a new limited access highway cuts through their lands. Also, it sought to determine the relationships existing between certain variables when farmland is taken for right-of-way purposes. The specific objectives were to determine: (1) Adjustments most frequently made by farmers after highway construction; (2) Land-use changes taking place after the highway was completed; (3) Effects of farm size, acreage taken and distance to a nearby urban center on appraised and final compensation for land and buildings taken and damages to the remainder; (4) General attitude of farmers toward methods of appraising land, compensations for land and buildings taken and damages to the remaining parcels, the conduct of negotiators, and the location of the highway. This study was limited to the impact of right-of-way acquisitions on farming in southeastern Pennsylvania.

PB-169 488 **Field 13B, 8G**
CFSTI Prices: HC$4.00 MF$1.00
Kansas State Highway Commission.
MATERIALS INVENTORY OF SHERMAN COUNTY, KANSAS.
Materials inventory rept. no. 6,
by Gerald Hargadine, Dale Johnson, and Dale Mahan. 1964, 122p
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Kansas), (*Rock (Geology), Construction), Materials, Silt, Sand, Gravel, Water supplies, Structural geology.

The construction material resources of Sherman County are restricted to the Ogallala Formation

and the more recent alluvial deposits found in the major stream valleys. The Ogallala Formation is composed chiefly of silt, sand, and gravel with some localized calcium-cemented zones termed mortar bed. The Ogallala Formation is overlain by the Loveland and Peoria Formations which have a combined thickness of up to fifty feet in the upland areas of the county. The presence of these thick silt deposits generally makes it economically infeasible to produce construction material from the Ogallala in these areas, but it can be produced along the valleys where stream action has removed most of the silt overburden. All of the material pits in Sherman County are located in the stream valleys where a minimum amount of overburden is present. The Alluvium which is found in the major stream valleys is composed of silt, sand, and gravel derived from the Ogallala, Loveland, and Peoria Formations. Because the Ogallala is the source of the sand and gravel in the alluvial deposits, material of similar quality can be produced from both sources; however, the more abundant supply of material available from the older Ogallala deposits has retarded exploitation of the Alluvium. (Author)

PB-169 490 **Field 13B**
CFSTI Prices: HC$4.00 MF$0.75
North Carolina State Univ., Raleigh. School of Engineering.
AN INVESTIGATION ON CRITICAL PROBLEMS OF ESTABLISHING AND MAINTAINING A SATISFACTORY SOD COVER ALONG NORTH CAROLINA HIGHWAYS.
Interim rept., 1962-65,
by W. B. Gilbert and D. L. Davis. Jul 65, 102p Rept. no. 0394
Proj. ERD-110-S
Prepared in cooperation with North Carolina State Highway Commission and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, North Carolina), (*Soils, Plants (Botany)), (*Soil stability, Plants (Botany)), Grasses, Erosion, Fertilizers.

MULCHES: Hay or straw mulch with an asphalt binder was the most effective mulch tested. Woodcellulose fiber was acceptable at 1,200 to 1,400 lbs. per acre, and has advantages where weed-free sod is necessary. FERTILIZERS: Nitrogen, phosphorus and lime were particularly important during the establishment phases of sod. Potassium had relatively little effect (slightly better at 100 lbs. per acre than at 200 lbs.) except, perhaps, in lighter, sandier soils. Fertilizer is necessary to maintain erosion-resistant sod. Nitrogen is the key element; 50 lbs. of available nitrogen plus 100 lbs. of ureaform should suffice for a 2-year period. Other elements in lesser amounts at less frequent intervals should be supplied. SPECIES ADAPTATION: Studies have been conducted to find suitable species other than tall fescue and sericea lespedeza for slope seeding. Pensacola Bahia and bermudagrass developed acceptably dense stands. DITCH LINERS: Control of erosion in ditches with grades between 3 and 6 percent is a difficult and specialized problem, unless costly concrete is used. Of the several materials used, excelsior was the most effective, but fiber density interfered with seedling emergence. (Author)

PB-169 492 **Field 13B**
CFSTI Prices: HC$2.00 MF$0.50
Bureau of Public Roads, Washington, D. C.
DEVELOPING AND ANALYZING FUNCTIONALLY CLASSIFIED HIGHWAY NETWORKS UTILIZING TRAFFIC SIMULATION. PHASE I.
Highway planning technical rept. no. 3,
by B. G. Bullard. Feb 66, 33p

Descriptors: (*Urban planning, Roads), (*Roads, Urban areas), (*Traffic, Simulation), Computers, Transportation.

The paper reports results of the initial phase of a project aimed at adapting computer-oriented techniques of traffic simulation to the development and analysis of functionally classified highway networks. The first phase was basically a procedural development effort which utilized data from a small urban area transportation study. Part I provides essential background for what follows by discussing briefly the basic concepts of functional classification and traffic simulation. Part II describes a classification process which incorporates the analytic capabilities of traffic simulation in the development of a functionally classified highway network. Part III describes the evaluation of the functional network as developed in Part II, again using computer-oriented techniques of traffic simulation. (Author)

PB-169 493 **Field 13B**
CFSTI Prices: HC$6.00 MF$1.25
Ernst and Ernst, Cleveland, Ohio.
FINANCIAL MANAGEMENT STUDY FOR THE TEXAS HIGHWAY DEPARTMENT AND THE U. S. DEPARTMENT OF COMMERCE, BUREAU OF PUBLIC ROADS. VOLUME I.
Special rept.
1 Jan 66, 229p Rept. no. 0375
See also PB-169 494.

Descriptors: (*Roads, Texas), (*Management planning, Roads), Money, Costs, Data processing systems, Per sonnel management, Manpower studies, Law, Passenger vehicles, Computers.

Identifiers: Accounting.

Primary areas of investigation included accounting, organization, data processing hardware, manpower controls, and legislative considerations. Considerable emphases was placed on fiscal matters including establishment of a new division to coordinate all accounting and financial reporting activities. (Author)

PB-169 494 **Field 13B**
CFSTI Prices: HC$5.00 MF$1.00
Ernst and Ernst, Cleveland, Ohio.
FINANCIAL MANAGEMENT STUDY FOR THE TEXAS HIGHWAY DEPARTMENT AND THE U. S. DEPARTMENT OF COMMERICE, BUREAU OF PUBLIC ROADS. VOLUME 2.
Special rept.
1 Jan 66, 165p Rept. no. 0375
See also PB-169 493.

Descriptors: (*Roads, Texas), (*Management planning, Roads), Money, Costs, Graphics, Data processing systems, Computers, Personnel manage ment, Manpower studies, Law, Passenger vehicles, Graphics.

Identifiers: Accounting.

PB-169 496 **Field 13B**
CFSTI Prices: HC$3.00 MF$0.75
Highway Management Associates, Madison, Wis.
MANAGEMENT RESEARCH STUDY ON THE STATE HIGHWAY DEPARTMENT OF GEORGIA.
12 Apr 65, 80p Rept. no. 0093
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Georgia), (*Management planning, Roads), Public relations, Data processing systems, Costs, Personnel management, Manpower studies.

The report provides a comprehensive study of the Georgia Highway Department's organization structure and practices. The areas of study included personnel policies, organization, manpower requirements, fiscal procedures and long-range management and operational planning and control. Four separate comprehensive progress reports were submitted in addition to the final report as follows: (1) personnel affairs, (2) legislative requirements, (3) county contract systems, and (4) contract administration. Particular emphasis was placed on a workable organization structure and on procedures required for current billing/concurrent audit.

PB-169 501 **Field 13B**
CFSTI Prices: HC$7.60 MF$2.00
Jorgensen (Roy) and Associates, Gaithersburg, Md.
INDIANA STATE HIGHWAY COMMISSION MANAGEMENT IMPROVEMENT PROJECT.
Final rept., 1962-64.
21 Dec 64, 456p Rept. no. 0079
Prepared in cooperation with Indiana State Highway Commission and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Indiana), (*Management planning, Roads), Personnel management, Training, Production control, Manpower studies.

PB-169 506 **Field 13B**
CFSTI Prices: HC$4.00 MF$0.75
Idaho Univ., Moscow. Engineering Experiment Station.
A PILOT STUDY OF MAINTENANCE COSTS OF IDAHO HIGHWAYS,
by William J. Parman. Mar 65, 102p Rept. no. 0116
Proj. 32
Prepared in cooperation with Idaho Dept. of Highways and Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Maintenance), Costs, Least squares method, Idaho.

The purpose was to investigate factors which influence maintenance expenditures and to develop mathematical formulas to predict future maintenance costs by means of least squares regression analyses. Factors which were investigated to determine their influence on maintenance expenditures included climate, environment, and highway characteristics. Maintenance expenditures were limited to those for snow removal, travelway-routine repair, and the total routine work. The 80-series IBM multiple linear regression program was used on the IBM 1620 computer to analyze the data and print the results. The regression analyses of snow-removal expenditures and total routine work were statistically significant, and they are offered as valid explanations of these expenditures. The analysis of travelway-routine repair expenditures was statistically nonsignificant, and the results are not conclusive in explaining the expenditures. Climatic data were the most important factors in explaining maintenance expeditures.

PB-169 507 **Field 13B**
CFSTI Prices: HC$2.00 MF$0.50
Ohio Highways Dept. Div. of Operations.
OPERATIONS AND MAINTENANCE COST STUDY: COST RESULTS AT END OF THIRD YEAR.
Interim rept.,
by Richard McLaughlin. 3 Jun 65, 29p

Descriptors: (*Roads, Maintenance), Costs, Pavements, Ohio.

The interim report includes brief summary of study history, a statement of methology and definitions of terms. Field data for two or three-year periods on a number of test sections have been summarized and presented in tables which show: (1) Characteristics of test sections. (2) Total and average per mile costs for various maintenance operations (pavement, berm, etc.) on each section. (3) Summary of average costs by system, pavement and type, year, etc. (Author)

PB-169 508 **Field 13B**
CFSTI Prices: HC$7.00 MF$1.75
Alabama Univ., University. Bureau of Legal Research.

A STUDY OF HIGHWAY LAWS OF THE STATE OF ALABAMA WITH SUGGESTIONS FOR REVISION.
Alabama Highway research rept.,
Jun 65, 370p HPR-12
Sponsored by Alabama Highway Dept. Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Alabama), (*Law, Roads).

A legal analysis of existing Alabama highway laws, including relevant case decisions, was conducted as the basis for the report. The report has the effect of codifying and organizing Alabama highway law into a comprehensive body of law, including sections which were 'lost' in the statutes, pointing out inconsistencies and suggesting areas where revisions and additions would prove beneficial. The report is compartmentalized by standard topices and the law is covered on a section by section basis with case decisions, revisor's notes, and comments following each section, rather than being organized by column as some of the other law studies have been. (Author)

PB-169 509 **Field 13B, 18D**
CFSTI Prices: HC$2.00 MF$0.50
Colorado State Dept. of Highways. Planning and Research Div.
DEVELOPMENT OF NUCLEAR DENSITY TESTS FOR HOT ASPHALT PAVEMENTS.
Final rept.,
by Wayne R. Brown. 1965, 36p Rept. no. 0102
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Civil engineering, Asphalt), (*Asphalt, Pavements), (*Pavements, Asphalt), (*Nuclear industrial applications, Civil engineering), Hot working, Roads, Densimeters, Nuclear engineering.

PB-169 511 **Field 13M, 13B**
CFSTI Prices: HC$2.00 MF$0.50
North Carolina State Univ., Raleigh. School of Engineering.
THE DEVELOPMENT OF ANALYTICAL PROCEDURES FOR DETERMINING ECONOMIC CROSSINGS BY STREAMS, PART I.
Final rept. pt. 1 on Highway Research Program,
by M. Amein, P. D. Cribbins, J. M. Lynch, andC. E. Sams. 31 May 64, 49p
Proj. ERD-110-Pt-1
Prepared in cooperation with North Carolina State Highway Commission and Bureau of Public Roads, Washington, D. C. See also PB-169 512.

Descriptors: (*Roads, Bridges), (*Bridges, Roads), Economics, Analysis, Traffic, Costs, North Carolina.

The method of economic analysis considers all direct and indirect costs of providing and maintaining stream crossings on secondary roads. The method was tested by applying the procedure to an actual stream crossing. The crossing, chosen with the assistance of hydraulic engineers from the North Carolina State Highway Commission, was selected because of the availability of stream flow records for the river at the crossing site for a period of 35 years. The crossing, known locally as Fishdam Bridge, is located on the Neuse River in northern Wake County, North Carolina. The roadway is a two-lane facility and is classified as a secondary route. RESULTS: The most economical crossing for the test site under existing conditions of traffic (100 vpd.) is the shortest bridge that can be constructed to span the natural channel in combination with the lowest possible fill. This crossing still appears as the optimum at an assumed traffic flow of 1500 vpd. This would indicate that, for the particular crossing, the economic analysis is relatively insensitive to changes in traffic in the lower traffic volumes. It cannot be said that this observation will be typical for other secondary stream crossings, however, since a change in any one of the factors affecting detour costs per vehicle, such as incremental detour distance, might introduce greater sensitivity to the economic influence of traffic.

PB-169 512 **Field 13M, 13B**
CFSTI Prices: HC$3.00 MF$0.75
North Carolina State Univ., Raleigh. School of Engineering.
MANUAL OF PRACTICE, THE DEVELOPMENT OF ANALYTICAL PROCEDURES FOR DETERMINING ECONOMIC CROSSINGS OF STREAMS, PART II.
Final rept. pt. 2, on the Highway Research Program,
by M. Amein, P. D. Cribbins, J. M. Lynch and C. E. Sams. 31 May 64, 79p
Proj. ERD-110-P-Pt-2
Prepared in cooperation with The North Carolina State Highway Commission and Bureau of Public Roads, Washington, D. C. See also PB-169 511.

Descriptors: (*Roads, Bridges), (*Bridges, Roads), Economics, Analysis, Traffic, Costs, Construction, Floods, North Carolina.

PB-169 513 **Field 13B, 13L**
CFSTI Prices: HC$3.00 MF$0.75
California State Div. of Highways, San Bernardino.
DYNAMIC FULL SCALE IMPACT TESTS OF CABLE TYPE MEDIAN BARRIERS TEST SERIES IX,
by R. N. Field and M. H. Johnson. Jun 65, 59p
Rept. no. 0174
Proj. W.O. 6302
Preared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Roads, Safety devices), (*Impact shock, Passenger vehicles), (*Safety devices, Roads), Motor vehicle accidents, Structures, Experimental data, Safety.

Test Series IX representing six full scale dynamic impact tests of cable type median barriers, using both sports cars and standard size vehicles, was conducted on cable-chain link barriers placed on simulated raised and sawtoothed medians were preceded by ten preliminary vehicle jump tests. The purpose of the jump tests was to develop test criteria for establishing the most effective cable height and spacing to be used in the subsequent dynamic impact tests. This report describes the test procedures and results based on data secured from the ten preliminary jump tests and the six high speed impact tests. Recommendations, based on the results of this test series (IX), are made for establishing the criteria to be used in determining the physical placement of cable type barriers on flat, raised and sawtooth type medians. Radio control techniques and photographic instrumentation used for this test series were identical to those used in previous barrier test series. (Author)

PB-169 514 **Field 13B**
CFSTI Prices: HC$2.00 MF$0.50
California State Div. of Highways, San Bernardino.
AN EXPERIMENTAL GLARE SCREEN INSTALLATION ON U. S. 101 IV-MRN-1-C BETWEEN TAMALPAIS ROAD AND CORTE MADERA CREEK,
by R. N. Doty and C. R. Ledbetter. Mar 65, 30p
Rept. no. 0180
Prepared in cooperation with Bureau of Public Roads, Washington, D. C. Rept. no. 0236.

Descriptors: (*Roads, Visual signals), (*Visual signals, Roads), Passenger vehicles, Polyethylene plastics, Nylon, Steel, Aluminum, Reflection, Propenes, Polymers.

The report summarizes the effectiveness of six different types of screen material exposed under experimental field conditions. The types included chlorosulfonated polyethylene coated nylon webbing woven into two inch galvanized steel chain link mesh, polypropylene webbing woven into chain link mesh, prepainted aluminum slats, amorphous phosphate-chromate color treated aluminum slats, expanded galvanized steel and expanded prepainted aluminum. The objectives were to test the effectiveness of each type as a headlight glare screen and to test durability and relative maintenance costs and ease of replacement. The results of observations and tests were the basis for recommending prepainted expanded aluminum mesh for glare screens on cable type median barriers. (Author)

PB-169 515 **Field 13K, 13B**
CFSTI Prices: HC$3.00 MF$0.75
Kentucky Dept. of Highways, Lexington. Div. of Research.
ANNUAL PERFORMANCE SURVEY OF REINFORCED CONCRETE PIPE CULVERTS (5th.)
Research rept.,
by R. D. Hughes. Jun 65, 74p Rept. no. 0180

Descriptors: (*Pipes, Reinforced concrete), (*Rein forced concrete, Pipes), Design, Performance (Engineering), Roads, Installation, Visual inspection.

In order to comply with the request of BPR Circular Memorandum 22-42 dated November 12, 1959, that a number of reinforced concrete pipe culverts be designed and installed in accordance with outlined procedures, and be inspected periodically and evaluated, a number of installations were made. The culverts selected for yearly inspections are in Jefferson, Shelly, Franklin, Clark, Montgomery, Scott, Grant, and Kenton Countries. Each culvert was inspected once each summer during the five summers from 1960 through 1964. The report summarizes the design and construction factors and the performance for each pipe inspected during the five summers. Findings of the first yearly inspection resulted in widespread alarm; and, as a consequency, great emphasis was placed upon rigid inspection of all reinforced concrete pipe installations. The final conclusion was that the design and installation criteria of BPR was valid but it was important to adhere to the prescribed bedding details. (Author)

PB-169 516 **Field 13B, 8M**
CFSTI Prices: HC$3.00 MF$0.75
California State Div. of Highways, San Bernardino.
STRENGTH CHARACTERISTICS OF COMPACTED SOILS.
Materials and research dept. research rept.,
by Bennett T. Squires. 24 Aug 65, 53p M/R-226118-1
Prepared in cooperation with Bureau of Public Roads, Washington, D. C.

Descriptors: (*Soil mechanics, Roads), (*Roads, Soil mechanics), (*Compressive properties, Soil mechanics), Foundations (Structures), California, Moisture, Density, Test methods, Impact shock.

This research was conducted to obtain data on the strength of soils considered for use as embankment material under conditions of 90% and 95% relative compaction and moisture contents ranging from optimum to a zero air voids condition, as determined by the California Impact Test and by the new California Soil Moisture Density Apparatus. Results attained indicated that strengths at relative compactions of 90% and 95% as determined by the California Impact Test were consistently higher than those determined by the California Soil Moisture Density Apparatus. Emphasis was placed on the determination of embankment heights that could be safely constructed from several materials under various conditions of moisture and density. Five soils were tested for strength characteristics at varying degrees of compaction and moisture and were found theoretically able to support embankment heights ranging from five to over 1000 feet. (Author)

PB-169 560 **Field 13F**
CFSTI Price: HC$1.00
Japanese National Railways, Tokyo (Japan). Railway Technical Research Inst.
RAILWAY ENGINEERING ABSTRACTS 1965. VOLUME 4, NO. 4.
Dec 65, 18p

Descriptors: (*Railroads, Industrial research), (*Japan, Railroads), (*Abstracts, Railroads), Industrial equipment, Scientific research, Industries.

This publication is issued by the Japanese National Railways for the purpose of introducing the articles concerning railway technique written by the Japanese engineers and researchers. The abstracts prepared in English and carried by this publication represent the major periodicals in Japan as selected by the Center. The Japanese titles indicate that the originals are in Japanese.

PB-169 561 **Field 13F**
CFSTI Price: HC$3.00
Japanese National Railways, Tokyo (Japan). Railway Technical Research Inst.
QUARTERLY REPORT OF THE RAILWAY TECHNICAL RESEARCH INSTITUTE 1965. VOLUME 6, NO. 4.
Dec 65, 63p

Descriptors: (*Railroads, Industrial research), (*Japan, Railroads), (*Reports, Railroads), Industrial equipment, Scientific research, Industries.

PB-169 625 **Field 13B, 8H**
CFSTI Prices: HC$4.00 MF$1.00
Department of the Interior, Washington, D. C. Office of Water Resources Research.
COOPERATIVE WATER RESOURCES RESEARCH AND TRAINING.
Annual rept. for 1965.
Dec 65, 146p
Activities authorized by Water Resources Research Act of 1964 (78 Stat. 329).

Descriptors: (*Water supplies, United States), (*Research program administration, Water supplies), Scientific research, Education, United States Government.

CONTENTS: Report of Special Advisory Panel; The Water Resources Research Act and Its Launching; Early Accomplishments Under the Act; Research Started Under the Act; Interest of Other Agencies, Firms, Institutions, and Individuals; Strengthened Academic Capability for Student Training and Research; and Role of the Office of Water Resources Research.

14. METHODS AND EQUIPMENT

AD-403 268 **Field 14A, 5A, 15E**
CFSTI Price: HC$1.60
RAND Corp., Santa Monica, Calif.
USES OF AUTOMATED FORCE COST MODELS,
by R. N. Grosse and A. Proschan. Apr 63, 19p RM-3608-ASDC
Contract SD-83

Descriptors: (*Cost effectiveness, Armed forces budgets), (*Logistics, Cost effectiveness), (*Manage ment engineering, Cost effectiveness), Department of Defense, Operations research.

An automated force cost model is a device for rapidly computing resource and cost requirements of a force specified as to its composition in force units, deployments, equipping and manning levels, and numerous other cost-affecting characteristics. The newly established planning-programming-budgeting cycle in the Department of Defense has created a greater demand for resource and cost estimating, and this has brought cost modeling into greater prominence. While actual operating experience with cost models has thus far been largely confined to the planning phase, there are substantial uses that can be visualized for models in programming and budgeting as well. After a discussion of the uses of cost models in planning, this Memorandum outlines the several uses in programming and budgeting, both as alternates to estimates by program managers and as adjuncts to them. (Author)

AD-407 323 **Field 14A, 15E, 5A**
CFSTI Price: HC$9.60
RAND Corp., Santa Monica, Calif.
NAVY COST MODEL,
by A. J. Meltsner and H. R. Swaine. Jun 63, 100p RM-3660-ASDC
Contract SD-83

Descriptors: (*Cost effectiveness, Navy budgets), (*Navy budgets, Cost effectiveness), (*Management engineering, Cost effectiveness), Costs, Mathematical models, Operations research, Logistics.

The purpose of this briefing is to present a description of the preliminary work on a Navy cost model. This cost model is to be used for rapid cost estimating of alternative forces for use in cost-effectiveness studies and for projecting approximate budget levels. In the initial development of this model, a determination was made as to the kinds of output the model should have. In general, these outputs are to be compatible with those of the OSD programming system. The model is structured to simulate Navy processes in a simplified manner, the structure being based on a study of the organization, policies; and procedures of the Navy. Finally, highly summarized statements of research projects are presented for the over-all model development work. (Author)

AD-448 247 **Field 14C**
CFSTI Price: HC$6.60
American Scientific Corp., Alexandria, Va.
VARIABLE SPEED RECORDER-REPRODUCER.
Final rept., 12 Mar-14 Oct 63,
by Donald E. Reed. 26 Nov 63, 63p ASC-403
Contract DA-36-039-sc-89067

Descriptors: (*Magnetic recording systems design), Variable-speed drives, Magnetic tape, Performance - (Engineering), Amplifiers, Wiring diagrams.

The report describes a magnetic tape recorder-reproducer, two channels, capable of recording and reproducing at any tape speed between one and twenty inches per second. (Author)

AD-457 170 **Field 14D, 15E**
CFSTI Prices: HC$32.50
Picatinny Arsenal, Dover, N. J. Nuclear Reliability Div.
RELIABILITY HANDBOOK.
Interim publication,
by A. Bulfinch. Mar 62, 333p ORDBB-NR-126

Descriptors: (*Reliability, Weapon systems), (*Handbook, Reliability), Statistical analysis, Test methods, Failure (Mechanics), Safety, Sampling, Quality control.

The following are set forth: (a) The concept of reliability of functioning characteristics of weapon components in terms of stress and strength; (b) The operating engineering definition of reliability; (c) The complex nature of reliability; (d) Ultimate reliability in terms of safety margins; (e) The relationship between test and use conditions; (f) The limitations of reliability determinations imposed by testing facilities, information and cost.

AD-464 018 **Field 14B**
CFSTI Price: HC$7.35
Honeywell, Inc., West Covina, Calif. California Ordnance Center.
A STUDY OF OPTICAL SYSTEM CONCEPTS AND HIGH INTENSITY LIGHT SOURCES FOR SOLAR RADIATION SIMULATION,
by Roger R. Hughes and Halbert Fischel. May 65, 431p H-6152-19
Contract AF 40(600)-1069,
Proj. AF-8952,
Task 895211
AEDC TR-65-117
Prepared in cooperation with Messinger Consultants Co., San Marino, Calif.

Descriptors: (*Sun, Simulators), (*Solar radiation, Simulation), Electric arcs, Brightness, Collimotors, Tables, Optics.

The study was made to evaluate three new high-powered arc sources as possible radiation sources for a large modular solar simulator. The three sources are (1) the Vortex Stabilized Radiation Source developed by Giannini Scientific Corp; (2) the Fluid Transpiration Arc developed by Vitro Laboratories; and (3) the High Intensity Carbon Arc developed by RCA Service Co. The radiation characteristics of the sources were studied to determine the spectral properties of the radiation from each source, and to permit derivation of mathematical expressions for the radiance distribution of each source. A careful review of the nature of solar radiation and of the theory of energy transfer in optical systems was conducted. On the basis of this review and the source radiance functions derived in the source study, several optical system concepts for solar radiation simulation were synthesized and analyzed for use with each source. The optical concepts studied range from simple parabolic collimators and uncollimated projection modules to systems consisting of trains of conic section reflectors and modifications thereto. (Author)

AD-466 360 **Field 14B, 10C**
CFSTI Prices: HC$7.60 MF$0.75
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
DESIGN AND OPERATION OF THE BATTERY POWER SUPPLY OF A HYPERSONIC PROPULSION FACILITY (U).
Technical memo.,
by E. A. Bunt, R. T. Cusick, L. W. Bennett and H. L. Olsen. Feb 65, 72p TG-660
Contract NOw-62-0604-c

Descriptors: (*Storage batteries, Arc heaters), (*Arc heaters, Hypersonic wind tunnels), (*Hypersonic wind tunnels, Arc heaters), Powder supplies, Plasma medium, Design, Operation, Remote control systems, Safety, Systems engineering.

A power supply composed of 1140 submarine lead-acid cells for operating split-ring plasma arcs at the Propulsion Research Laboratory of The Johns Hopkins University is described, and its raison d'etre is reviewed in the light of flight simulation requirements. Since arc operation places a more severe load on such a battery than is usual, attention has been paid to arc stability in the light of operating limits caused by circuit transients and the onset of the voltage reversal phenomenon. The control equipment includes a water-cooled ballast resistor and special switches to handle the making and breaking functions (which have been separated). Remote operation ensures the basic safety of personnel, but numerous additional safety features have been incorporated. (Author)

N66-15001 **Field 14B**
CFSTI Prices: HC$2.00 MF$0.50
Public Health Service, Phoenix, Ariz. Technology Branch.
COMPARATIVE LEVELS AND TYPES OF MICROBIAL CONTAMINATION DETECTED IN INDUSTRIAL CLEAN ROOMS,
by M. S. Favero, J. H. Marshall, G. S. Oxborrow, and J. R. Puleo. 9 Dec 65, 46p Rept. no. 9
Contract NASA Order-R-137
NASA CR-69216

Descriptors: (*Clean rooms, Contamination), (*Microorganisms, Detection).

N66-15064 Field 14B
CFSTI Prices: HC$3.00 MF$0.75
Texas A and M Research Foundation, College Station. Activation Analysis Research Lab.
AN INVESTIGATION OF COMPUTER COUPLED AUTOMATIC ACTIVATION ANALYSIS AND REMOTE LUNAR ANALYSIS.
Quarterly progress rept., 1 Nov 62 - 1 Feb 63,
by L. E. Fite, E. Ibert, E. L. Steele, R. E. Wainerdi, and W. Wilkins. 1 Feb 63, 74p
Contract AT (40-1)-2671, Grant NsG-256-62
NASA CR-69215

Descriptors: (*Mice, Radiation effects), (*Selenium, Determination), (*Silver, Determination).

NBS-TN-269 Field 14B, 17G
CFSTI Prices: HC$0.20 MF$0.50
National Bureau of Standards, Washington, D. C. Inst. for Applied Technology.
EARTH'S FIELD STATIC CALIBRATOR FOR ACCELEROMETERS,
by P. S. Lederer and J. S. Hilten. 1 Feb 66, 20p

Hard copy also available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.20, as C13.46:269.

Descriptors: (*Accelerometers, Calibration), (*Test equipment, Accelerometers), Gravity.

This paper describes a simple, relatively inexpensive system for the precise static calibration of accelerometers in the earth's gravitational field with an estimated limit of error of plus or minus 0.0004 g. The system consists of a precision machinists dividing head on a surface plate and a precision level. Experimental results obtained during the calibration of three types of accelerometers are shown to indicate the capabilities and usefulness of the system. (Author)

Patent 3,228,237 Field 14B
TEST FIXTURES FOR DETERMINING THE COMPRESSIVE OR TENSILE STRENGTH OF VARIOUS RINGS.
Patent assigned to Navy,
by Lowell R. Newton. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Rings, Test equipment), Compressive properties, Tinsile properties.

A test fixture is provided in which the test ring is kept circular at all times. The compressive or tensile force is exerted upon the circumference of the test ring equally and simultaneously by each of seventy-two rigid steel rocker arms. A central axial load applied at one point initiates movement of the arms. The fixture minimizes friction variables thereby allowing precise measurement of the stress and strain of the test ring. The test fixture is used in a standard compression testing machine.

Patent 3,228,287 Field 14E
DEVICE FOR COMPILING INFORMATION FROM AN ANAGLYPH.
Patent assigned to Army,
by Felix F. Bizzoco and Joseph B. Theis. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Photointerpretation, Photographic projectors), (*Photographic projectors, Photointer pretation), Color photography, Stereoscopy photography, Photointerpretability, Aerial photography.

Identifiers: Anaglyph.

The apparatus is for extracting information from an anaglyph. It is useful for compiling topographical maps from aerial photographs. An oriented spatial model is prepared from a pair of aerial photographs. The projected images of the spatial model are then photographed and printed on a common sheet with one image printed in one color and superposed upon the second image which is printed in a complementary color to produce a photogrammetric anaglyph. Then the desired information is compiled by use of the novel anaglyphometer.

Patent 3,228,290 Field 14E
LARGE APERTURE ANISOTROPIC ELECTRO-OPTIC SHUTTER.
Patent assigned to Navy,
by James W. Davisson and Stewart I. Slawson. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Camera shutters, High-speed photography), Anisotropy, Crystals, Polarization.

The electro-optic crystal shutter has a field of view of the order of 40 degrees and a plurality of optic axes. A curved shutter plate is shown in which the optic axis is everywhere normal to the surface of the plate whereby transmission of polarized light through the plate may be electrically controlled. The amount of light transmitted is a function of the voltage applied to the crystal. The device may also be used as an ophthalmic shutter.

Patent 3,228,558 Field 14B
MEASURING DEVICE.
Patent assigned to NASA,
by Joseph C. Doyle, Frank A. Burgett, Dale G. Sauers and Robert M. Bernardin. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Liquids, Measurement), (*Meters, Liquids), Space environmental conditions, Tanks - (Containers), Diaphrams (Mechanical), Transducers.

The measuring device is applicable in measuring liquids in a tank under zero gravity. The device not only expels the liquid from the tank but also measures the quantity of fluid which remains in the tank during the expulsion operation. The device includes the tank, an extensible diaphram which divides the tank into two sections, and a transducer mechanism for translating diaphragm movement into a meaningful measurement.

Patent 3,234,780 Field 14B, 7B
TEMPERATURE COMPENSATED CONDENSATION PRESSURE ANALYZER.
Patent assigned to AEC,
by William S. Pappas. 15 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Gas analysis, Uranium compounds), Patents, Fluorides, Hydrocarbons, Mixtures, Determina tion, Pressure, Temperature.

The system is for continuously determining the concentration of uranium hexafluoride or other condensable gas in a gaseous mixture. The system involves the use of a line for transporting the gas, a control valve, a sensing element, an ice bath, a flow control downstream from the sensing element, a pressure recorder and a differential pressure monitoring device which is responsive to the difference in pressure for operating the pressure indicator.

Patent 3,236,263 Field 14B
DIFFUSER POSITIONING DEVICE.
Patent assigned to Army,
by Oscar C. Holderer. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Positioning devices (Machinery), Diffusers), (*Diffusers, Wind tunnels), Patents.

The device is for adjusting the walls of the diffuser section of a wind tunnel. The diffuser section includes a stationary wall, a pair of movable diffuser walls and a diffuser throat section. Each of the diffuser walls is provided with a novel positioning apparatus including cylinder, a hydraulically operated piston associated with valves, connecting conduits and levers, and electrical control circuitry and components.

Patent 3,237,095 Field 14B, 19A
TEST DEVICE FOR IMPACT AND CENTRIFUGAL SWITCHES UTILIZING A MAGNETIC FIELD TO SIMULATE INERTIAL FORCES.
Patent assigned to Army,
by William R. Patterson and Arnold Steckler. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Impact fuzes, Test equipment), (*Test equipment, Impact fuzes), Patents, Magnetic fields.

The magnetic test device is for the destructive testing of impact fuses having inertial switches such as the Army M217-type. The device permits random sampling of fuses. It simulates the inertial forces which would be experienced in actual operation of the fuse. The closing of the switch detonates the fuse.

PB-169 423 Field 14B
CFSTI Prices: HC$1.60 MF$0.50
Boeing Co., Seattle, Wash. Aero-Space Div.
SPECTRUM ANALYZER POLARAD MODEL TSA.
Technical manual instrument calibration procedure, GW-05.
1 Dec 65, 18p
Contract N123 (62861)35056A
NAVWEPS 17-20GW-05

Descriptors: (*Spectrum analyzers, Calibration), (*Test equipment, Calibration), Naval equipment, Radiofrequency, Instrumentation.

A procedure is given that describes the calibration of the Polarad Model TSA Spectrum Analyzer. This consists of the main chassis, Model DU, and the Tuning Unit STU3A. The Test Instrument gives a spectral display of the frequency distribution of the RF signal energy in the frequency range of 4.37 to 22 GHz. CW and pulse radio signals are presented visually as a plot of voltage vs. frequency.

PB-169 434 Field 14B, 13A
CFSTI Price: HC$9.60
Michigan Univ., Ann Arbor. Engineering Research Inst.
INVESTIGATION OF HEATING OF AIR STREAM IN A WIND TUNNEL BY MEANS OF AN ELECTRICAL DISCHARGE.
Final rept.,
by Haldon L. Smith and Harold C. Early. Oct 54, 93p
Contract DA-20-018-ORD-13047,
Projs. 2154-3-F, DA-TB-3-0108
AD 50 379

Descriptors: (*Wind tunnels, Arc heaters), (*Arc heaters, Wind tunnels), Air, Heating, Electric discharges.

Experiments have been made in a 1 in x 1 in 'blow down' wind tunnel to test the feasibility of using an electric arc for adding heat to a Mach 4 airstream. The arc column was stabilized transverse to the flow by means of a strong magnetic field, sipated. However, uniform heating was not ob-

tained, because the arc had a strong tendency to concentrate in the boundary layer and appeared to fill only about 1/2 to 2/3 of the tunnel cross section. As a means of circumventing these difficulties, several alternative electrical heating methods ar proposed. It is believed that these proposed methods hold much more promise than the system which was tested. (Contractor's abstract)

PB-169 436 **Field 14B, 21B, 20D**
CFSTI Price: HC$2.60
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
INSTALLATION AND CALIBRATION OF A SUPERSONIC COMBUSTION TUNNEL.
Technical note,
by P. M. Rubins. Sep 60, 30p AEDC-TN-60-162
Contract AF 40(600)-800,
Proj. ARO-105025
AD 242 516
Prepared in cooperation with ARO, Inc., Arnold Air Force Station, Tenn.

Descriptors: (*Supersonic flow, Combustion), (*Combustion, Supersonic flow), (*Laboratory equipment, Combustion), Combustion chambers, Installation, Calibration.

Identifiers: Supersonic combustion tunnels.

A Mach number 3 supersonic combustion tunnel, designed, constructed, and operated by Fairchild Engine Division Research Laboratory under the auspices of the Air Force Office of Scientific Research, was transferred to the Rocket Test Facility at the Arnold Engineering Development Center during the latter part of 1959. The tunnel was designed especially to investigate wave-type combustion reactions in supersonic flow. This report describes the tunnel installation at AEDC and presents the tunnel calibration data. The phenomena observed and described in Fiarchild reports were duplicated at AEDC. (Author)

PB-169 641 **Field 14B, 11D, 11I**
CFSTI Prices: HC$2.60
Naval Ordnance Lab., White Oak, Md.
NOL HYDRAULIC RING TENSILE TESTER.
23 Dec 59, 28p NAVORD-6735
AD 239 250

Descriptors: (*Rings, Test equipment), (*Test equipment, Tensile properties), (*Tensile properties, Plastics), (*Hydraulic systems, Test equipment), Failure (Mechanics), Glass textiles, Reinforcing materials, Composite materials.

Identifiers: Hydraulic ring tester.

A new NOL hydraulic ring-tester-for the determination of the tensile properties of glass fiber reinforced plastics is described.

15. MILITARY SCIENCES

AD-414 902 **Field 15C, 5D, 17B**
CFSTI Price: HC$2.60
Raytheon Co., Bedford, Mass.
UNITED STATES CAPABILITIES FOR COMMAND AND CONTROL.
Phase 2 rept.,
by F. J. Schell, M. Kolker, C. Abt and M. S. Gordon.
Jan 63, 28p BR-2249
Contract SD-125

Descriptors: (*Command + control systems, United States), (*Arms control, United States), Decision making, Data processing systems, Display systems, Communica tion systems, Defense systems, Air Force.

To provide a basis for determining the capacity of the U. S. to execute unilateral arms controls, U. S. Command and Control capabilities--both present and future--require understanding. This volume presents a review of the field in terms of the technology, exemplar systems, command organizations, and policy considerations. By establishing this groundwork, specific elements of command and control can be analyzed to ascertain their contribution to the successful accomplishment of unilateral arms controls. The measures taken to reduce the accidental or mischievous initiation of wars the inadvertent escalation of wars, and the efficient prosecution of wars to a successful termination at minimum cost, all require specific command and control arrangements. In the next phase (III) of the Unicorn study, the functional considerations herein will be applied across a parametric analysis of a spectrum of environments, strategies, and weapon mixes directed toward specific unilateral arms controls in specific areas and time periods. (Author)

AD-462 466 **Field 15G, 1B, 1C**
CFSTI Prices: HC$11.60
Federal Aviation Agency, Atlantic City, N. J. Systems Research and Development Service.
EVALUATION OF FORWARD AREA ASSAULT PLANS FOR ARMY HELICOPTER OPERATIONS.
Final rept.,
by Donald O. Brown. Feb 65, 118p RD-65-17
Proj. FAA-150-530-01V

Descriptors: (*Helicopters, Army operations), (*Army operations, Helicopters), (*Instrument flight, Helicoptors), Military tactics, Air traffic control systems, Air traffic controllers, Pilots, Simulation, Flight testing, Navigation, Flight paths, Performance (Human).

An evaluation of operational plans was conducted to provide the U. S. Army with procedures, separation values, basic navigation and air traffic control requirements for use in helicopter assault missions under instrument flight conditions. The evaluation consisted of dynamic simulation as well as live flight tests. Live flight tests were conducted by the 11th Air Assault Division, Fort Benning, Georgia, with the assistance of Federal Aviation Agency project personnel to obtain information as to the ability of helicopter pilots to maintain an assigned airspeed, altitude, and track. Six operational plans for like and mixed-type helicopters resulted from the simulation. Each plan handled both normal and emergency situations and the movement rates established for each. It was concluded that the procedures, separation values, and equipment requirements as described for each of the six operational plans are adequate for use in conducting helicopter assault missions under instrument conditions. It was further concluded that pilot and controller proficiency are important to the successful conduct of a mission.

16. MISSILE TECHNOLOGY

AD-471 192 **Field 16D**
CFSTI Prices: HC$3.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
SUMMARY OF ACTIVITIES BUMBLEBEE TECHNICAL PANELS 1945-1964.
Technical memo.,
by C. J. Smith. May 65, 35p TG-692
Contract NOw-62-0604-c

Descriptors: (*Guided missiles, Research program administration), Aerodynamics, Weapon systems, Guidance, Launching.

Identifiers: Bumblebee project.

The Bumblebee Technical Panels were conceived and instituted in 1945 as an integral part of the Bumblebee weapon development program. These Panels served a number of useful functions in promoting guided missile technology and in providing a forum for working-level exchange of technical information by military, contractor, and APL personnel. It is the intent of this Summary: (a) to document the objectives and history of the Panel concept as used in the Bumblebee program, (b) to list for easy reference the statistics on each Panel for membership, meetings and minutes, (c) to list in the Bibliography selected reference documents on Panel policy and actions. The technical problems treated by the Panels can be found in the individual Minutes published by the APL Technical Reports Group. These volumes testify to the breadth of scope of the subject matter. (Author)

Patent 3,228,192 **Field 16A, 13G**
BUFFER MECHANISM FOR ADAPTER RAIL.
Patent assigned to Navy,
by Robert L. Kossan, Robert E. Carlberg, Louis H. Weber, Richard H. Allen, and Palmer G. Wermager. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Guide missile launchers, Adapters), Hydraulic systems, Patents, Energy, Absorption.

The buffer assembly is connected in a missile launching system which is capable of handling and launching three different types of missiles. The buffer assembly is in the form of a cylinder and piston which act as an energy absorber in the system. A valve controls the action of the piston.

Patent 3,228,293 **Field 16A, 13J**
APPARATUS FOR HANDLING MISSILES.
Patent assigned to Navy,
by Garold A. Kane, Arthur G. Blomquist, Harrison Randolph, John S. Scheurich, and Palmer G. Wermager. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Handling, Guided missiles), (*Guided missiles, Handling), Shipborne, Conveyors, Patents.

The apparatus is for handling guided missiles aboard ship. The apparatus includes a ready service ring and components for moving the missiles in a vertical position from the ring to a hoist and for steadying the missiles while they are being moved. The launcher is on the main deck of the ship and the storage and missile handling equipment is below the main deck.

Patent 3,228,295 **Field 16A, 13J**
GUIDED MISSILE LAUNCHING SYSTEM.
Patent assigned to Navy,
by Garold A. Kane, Harrison Randolph, Robert E. Carlberg, John S. Scheurich, and Palmer G. Wermager. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Guided missile launchers, Design), Shipborne, Handling, Patents, Storage.

The missile launching system is for use aboard a ship and is designed to handle missiles from stowage to the launcher. The system includes ready service ring arrangements for stowage of a plurality of missiles of one or more types and apparatus for selectively cycling, in either a clockwise or counterclockwise direction, the stowed missiles for selection of any one of the missiles for movement to the launcher.

Patent 3,228,296 **Field 16A, 13L, 13J**
ARRANGEMENT FOR VENTING BLAST GASES AND FOR WATER INJECTION.
Patent assigned to Navy,
by Milton C. Neuman and Anthony J. Hogen. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Guided missile launchers, Guide missile safety), (*Guide missile safety, Storage), Ventilation ducts, Fire extinguishers, Shipborne, Patents.

The missile launching system is designed for use on a ship. A multiplicity of separate compartments are positioned to provide a multiplicity of compartments arranged in two concentric circles, underlying the path of the missiles and spaced so as to provide a single compartment directly under each individual missile during each step in the rotation of the missiles from any storage position to the position at which the missiles are loaded onto the launcher arm. A passageway is provided for passage of gases formed due to inadvertent ignition of the missile fuel. An automatic fire extinguishing system is also disclosed.

Patent 3,228,297 **Field 16A, 13E**
ADAPTER RAIL RESTRAINING MECHANISM.
Patent assigned to Navy,
by Robert L. Kossan, Robert E. Carlberg, Louis H. Weber, Richard H. Allen, and Palmer G. Wermager. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Guide missile launchers, Adapters), (*Release mechanisms, Guide missile launchers), Disconnect fittings, Thrust, Patents.

The restraining mechanism holds a missile stationary on a launcher until a predetermined thrust has been developed. The restraining device is both positive and releasable upon exertion of a predetermined amount of force. Pawls are rotated to permit passage of the missile shoe past projections to release the missile when the thrust of the missile exceeds the force of a spring.

Patent 3,228,335 **Field 16D, 13E**
DOVETAIL LOCKING DEVICE.
Patent assigned to Navy,
by Robert S. Thompson. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Locking fastener devices, Fins), (*Fins, Guided missiles), Patents, Friction.

The dovetail locking device is used to secure fins to the rear end of a missile. A plurality of spaced bosses are secured to the missile by welding. Each fin carries a dovetail portion that is received by a dovetail slot in the boss. A plurality of metal discs, an actuator and a threaded screw are utilized to set up a force on the dovetail legs to force them apart and provide a friction lock for the dovetail components.

Patent 3,228,634 **Field 16D**
AIR-DRAG APPARATUS FOR MISSILES.
Patent assigned to Navy,
by George Chakoian, Russell T. Crowell and Alfred Ouellette. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Guided missiles (Air-to-underwater), Flight control systems), (*Flight control systems, Guided missiles (Air-to-underwater)), Drag, Patents, Guided missile trajectories, Descent trajectories, Deceleration, Stabilization, Stabilization systems, Airfoils.

The apparatus is for use in an air-to-sea delivery system in which a torpedo is delivered from a high speed jet aircraft. Accuracy of delivery is obtained by providing a constant drag force on the missile throughout its initial delivery trajectory. The system includes a plurality of vanes controlled hydraulically and resembling a parachute.

Patent 3,236,182 **Field 16D**
AIR VANE OF LOW HINGE MOMENTS.
Patent assigned to Army,
by Werner K. Dahm. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Guide vanes, Guided missiles), Patents, Moments, Aerodynamic characteristics.

The air vanes are for use on airborne missiles that fly at supersonic speeds and above. The vanes are wedge shaped in profile and generally rectangular in planform. The air vanes are designed with a thick trailing edge for high lifting efficiency and are so proportioned in profile and plan form that the shifts of the center of pressure with changing Mach number inherent in the planform and the profile approximately cancel each other so that each air vane may be hinged about an axis that is slightly forward and near the center of pressure of the air vane.

PB-169 203 **Field 16D**
CFSTI Prices: HC$3.00 MF$0.50
Naval Ordnance Test Station, China Lake, Calif.
WATER-ENTRY CAVITY MODELING. PART I. VERTICAL CAVITIES,
by J. G. Waugh and G. W. Stubstad. 8 Oct 56, 52p NOTS-1597
NAVORD 5365-Pt-1,
AD 128 957

Descriptors: (*Cavitation, Water entry), (*Water entry, Guided missile models), Gases, Density, Guided missile trajectories.

Modeling studies were conducted with a 2-inch-diameter hemisphere-head missile as a prototype and with 1and 1/2-inch-diameter models of the prototype. This modeling with models program was carried out to investigate the importance of gas-density scaling in conjunction with Froude and cavitation-number scaling in water-entry cavity modeling. The observation of the cavities formed by the vertical entry of these models showed that one-to-one scaling of the Froude and cavitation numbers and of the gas density coefficient modeled the cavity to a high degree of accuracy. Failure to scale the cavitation number did not prevent good modeling, but when the gas density coefficient was not scaled modeling did not occur. Good water-penetration-distance modeling obtained for all modeling conditions. Evaluation of the importance of atmospheric-density scaling on water-entry modeling must be deferred until tests are extended to include launchings of models at oblique angles. Cavitation-number scaling cannot be disregarded in the general water-entry modeling problem because it has been found necessary to model missile motion in oblique water entry. (Author)

17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES

AD-408 973 **Field 17B**
CFSTI Price: HC$7.60
Marquardt Corp., Van Nuys, Calif.
RESEARCH INVESTIGATIONS ON PHOTO FACSIMILE TRANSMISSION TECHNIQUES.
Quarterly progress rept. no. 3, 1 Jan-31 Mar 63, by W. H. Hell, B. Case, C. Schuppe, and J. A. Widmer. Apr 63, 77p Rept. no. 25083
Contract DA-36-039-sc-90862,
Proj. DA-3A99-12-001

Descriptors: (*Facsimile transmission, Optical images), Phosphorescent materials, Photoelectric materials, Ferroelectric materials, Data storage systems, Electronic scanners, Facsimile equipment, Feasibility studies.

The major effort on advanced photo facsimile transmission techniques was to experimentally demonstrate the feasibility of the ferrotron concept, and to explore possible means of matrix readout for the ferrotron. In the area of image transducing system analysis several methods of combining the exposure, readout and erasure functions of the image transducer into an integrated system are described. Special consideration is given to systems employing either the ferrotron, the polatron or the daptron type of storage element. A promising concept for an image transducing element, the polatron, was evolved. Several matrix scanning techniques for the electronic readout of a stored image were investigated. A matrix using ferrotron elements overcomes the isolation limitations inherent in matrix arrangements.

AD-417 225 **Field 17B, 20E, 20L, 9A**
CFSTI Price: HC$2.60
Texas Instruments, Inc., Dallas. Apparatus Div.
SOLID-STATE TECHNIQUES FOR MODULATION AND DEMODULATION OF OPTICAL WAVES.
Quarterly progress rept. no. 4, 1 Feb-30 Apr 1963, by Dayton D. Eden. 30 Apr 63, 27p Rept. no. U4-74000-4
Contract DA-36-039-SC-89221,
Proj. 3A-99-21-001

Descriptors: (*Modulation, Light communication systems), (*Demodulation, Light communication systems), (*Light communication systems, Modulation), (*Solid state physics, Light communication systems), Lasers, Modulators, Rutile, Single crystals, Diodes (Semiconductors), Quartz, Gases, Helium, Neon, Gallium alloys, Arsenic alloys, Ultrahigh frequency.

An optical am - fm converter using rutile has been successfully demonstrated at high UHF modulation frequencies. A traveling wave quartz modulator of light has been successfully demonstrated at high UHF modulation frequencies. The use of 'optical mixing' in a helium-neon gas phase laser as a modulation detection tool has proven quite successful. For example, Pockel's modulation at 910 mc has been monitored with a detector capable of responding to only a few hundred megacycles, by this method. Analysis of broadbanding photodiodes reveals a constant amplitude bandwidth product for single tuned photodiodes regardless of the center frequency. Multituning as well as the use of 'optical heterodyning' can improve on the constant. Microwave wideband photodiode circuits have been designed and are presently in the process of being tested. Modulated light from a gallium arsenide light emitting diode transmitted along a one meter air path has been detected by a silicon photodiode at 650 mc. (Author)

AD-446 155 **Field 17B, 9E, 20N**
CFSTI Prices: HC$4.60
Michigan Univ., Ann Arbor. Radio Science Lab.
BEYOND-LINE-OF-SIGHT DATA TRANSMISSION USING ADAPTIVE ARRAY TECHNIQUES,
by Frank E. Wilburn. Aug 64, 41p Rept. no. 2900-491-T
Contract DA-36-039-sc-78801,
Proj. DA-3D5801001

Descriptors: (*Data transmission systems, Microwave communication systems), (*Microwave communication systems, Phased arrays), (*Phased arrays, Microwave communication systems), (*Antenna arrays, Microwave communication systems), Antenna configurations, Dipole antennas, Antenna radiation patterns.

Identifiers: Michigan project.

State-of-the-art developments in adaptive array techniques applied to beyond-line-of-sight data transmission systems are reported. The general theory of beam-steering by means of a directional reference derived from received energy incident on the array elements is reviewed. The Van Atta method of connecting conjugate pairs of array elements and the phase-inversion principle of terminating each receiver element in a phase-inverting device are examined in detail. For each method, array configuations (i.e., planar array, curved array), element spacing, and the effects of polarization are discussed. Consideration is also given to the following areas (with particular emphasis on their applicability to beyond-line-of-sight relays):

types of modulation schemes, and frequency offset. The appendixes include the development of general array relationships to determine phase and amplitude characteristics, special circuitry for a receiving array, and the development of a phase-error approximation for a curved Van Atta array. (Author)

AD-454 600 **Field 17E, 17J**
CFSTI Prices: HC$6.60
Shell Development Co., Emeryville, Calif.
APPLICATION OF SOLID STATE TECHNIQUES TO THE ON-SITE INSPECTION PROBLEM.
Final technical rept.,
by Donald R. Lewis and W. R. Orr. Dec 64, 70p
Contract AF 49 (638)-128, ARPA Order-292

Descriptors: (*Underground explosions, Detection), Solid state physics, Instrumentation, Electrons, Minerals, Visual inspection, Sodium compounds, Limestone, Thermal properties, Luminescence, Glow discharges, Crystal lattices, Mechanical waves, Detona tion waves.

The passage of a pressure wave through a rock may produce defects in the lattice of the crystals which comprise the rock. These defects may be detected by measurement of thermoluminescence or exoelectron emission from certain rock types. In order to determine how sensitive these techniques may be for the on-site inspection problem, work has been done to develop apparatus for measuring exoelectron emission above room temperature and to investigate the influence of sample preparation on the thermoluminescence of some minerals. An exoelectron measuring unit has been built and used for some preliminary comparisons with thermoluminescence measurements on the same sample. It has been found that there may be additional defects contributing to the exoelectron emission which do not contribute to the thermoluminescence. Exoelctron measurements may be more sensitive than thermoluminescence for detecting the passage of a pressure wave. Several other electrical and optical techniques were considered and some recommendations have been made for the measurement of thermoluminescence spectra. General recommendations are made for the construction of exoelectron and thermoluminescence apparatus. (Author)

AD-454 808 **Field 17I, 9E**
CFSTI Price : HC$3.60
Airtron, Inc., Morris Plains, N. J.
DUPLEXER FOR SIDE-LOOKING RADAR.
Quarterly rept. no. 1, 1 Jul-30 Sep 64,
by Kenneth A. Lehman. Oct 64, 37p Rept. no. R11-460
Contract DA-28-043-AMC-00280 (E),
Proj. DA-1G6-22001-A-055-04
N65 20700

Descriptors: (*Radar duplexers, Side-looking radar), (*Side-looking radar, Radar duplexers), Microwave equipment, Limiters, Waveguide circulators, Resonators, Tests, Attenuation, Bandwidth, Radiofrequency power, Phase shifters, Waveguide switches, Garnet, Ferrites, Ferromagnetic materials, Magnesium compounds, Manganese compounds.

Identifiers: Ferrites (Electronic).

A three-cavity limiter was designed in which the middle resonator is a single crystal YIG sphere. This unit has been tested at low power and has met the insertion loss and bandwidth requirements. A three-port circulator has been designed. Six ferrite compositions were tested for peak power handling capability. Substantial improvements have been obtained by utilizing a 'hot pressing' technique in the preparation of the magnesium, manganese ferrite body. Data obtained, so far, show satisfactory power handling capability of one composition in excess of 200 kw peak with a .001 duty cycle. A four-port differential phase shift circulator model has been designed and constructed. Several ferrite compositions have been tested at low power level.

AD-462 618 **Field 17B, 9C**
CFSTI Price: HC$4.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
MINATURIZED RECEIVER FOR LOW ACCURACY TIME RECOVERY.
Technical memo.,
by E. E. Westerfield and J. R. Norton. Feb 65, 49p TG-664
Contract NOw-62-0604-c

Descriptors: (*Radio receivers, Time signals), (*Time signals, Radio receivers), (*Satellite tracking systems, Radio receivers), (*Miniature electronic equipment, Radio receivers), Navigation satellites, Signals, Electronic recording systems, Ground support equipment.

This paper describes a compact receiver recently developed at the Applied Physics Laboratory. The unit is so designed as to minimize both size and cost while maintaining simple construction. The principal use of the device is in receiving accurate time information from satellites of the Navy's Navigational Satellite System. The device is capable of providing accurate time information at any location in the world. It requires as a minimum only the use of the antenna which is mounted directly on the receiver case. The unit is battery operated but contains a charger for recharging the batteries when external power is available. The device provides an alert mode in which it can be left while waiting for the arrival of a satellite overhead. When this occurs, the unit emits a tone to indicate that a satellite is available for providing time information. (Author)

AD-462 836 **Field 17B, 5J, 9D**
CFSTI Prices: HC$3.00
Stanford Research Inst., Menlo Park, Calif.
TECHNIQUE FOR EVALUATION OF SPEECH SYSTEMS.
Semiannual progress rept. no. 1, 1 Jul-31 Dec 64,
by Frank R. Clarke, James C. Nixon, andStephen E. Stuntz. Apr 65, 100p
Contract DA 28-043-AMC-00227 (E),
Projs. DA-1E634301D246, SRI-5090,
Task DA-1E634301D24603

Descriptors: (*Speech transmission, Intelligibility), (*Intelligibility, Psychometrics), (*Voice communi cation systems, Intelligibility), Reliability, Automation, Auditory perception, Speech.

Identifiers: Evaluation.

The report covers the progress made and the conclusion reached during the first six months of effort on the development of an automated speech intelligibility test. The literature in intelligibility testing was surveyed and evaluated. Six of the most common intelligibility tests were compared in terms of their materials, employment of speakers and listeners, validity and reliability of results, and potential for automation. On the basis of theoretical considerations and well-known empirical findings, it is concluded that the requirement for a highly efficient and reliable automated test procedure can best be satisfied with a multiple-choice test in which the set of possible messages is known to the listener. (Author)

AD-463 140 **Field 17B, 22A**
CFSTI Prices: HC$2.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
OPTIMIZATION OF FREQUENCIES FOR LOW-ALTITUDE SPACE COMMUNICATION,
by Gaspar R. Valenzuela. Dec 64, 30p TG-637
Contract NOw-62-0604-c

Descriptors: (*Space communication systems, Optimization), (*Satellites (Artificial), Low altitude), Frequency, Signal-to-noise ratio, Absorption, Atmosphere, Extraterrestrial radio waves, Radio frequency interference, Magneto-optic effect, Antennas, Radio receivers, Direct current, Radiofrequency power.

A simple technique is presented for obtaining the optimum frequencies for communication with a low-altitude satellite, no higher than 800 nautical miles. The output signal-to-noise ratio at the receiving station is expressed in terms of as many parameters as possible with their respective frequency dependence. The optimum frequency is obtained by a maximization process. In cases where the exact frequency behavior of the process is too complex, an approximate analytical expression is used. The parameters considered in this investigation are: the spatial electromagnetic path loss, the atmospheric absorption, the galactic noise temperature, the Faraday rotation effect, the antenna noise temperature, the receiver noise temperature, and the conversioe efficiency of dc to rf power. The method yields optimum frequencies for the space-to-ground and the ground-to-space communication. For space-to-space communication the optimum frequency is selected from practical limitations. (Author)

AD-473 995 **Field 17B, 5J, 9D**
CFSTI Prices: HC$3.00 MF$0.75
Stanford Research Inst., Menlo Park, Calif.
TECHNIQUE FOR EVALUATION OF SPEECH SYSTEMS.
Final rept., 1 Jul 64-31 Jul 65,
by Frank R. Clarke. Aug 65, 64p
Contract DA-28-043-AMC-00227 (E),
Projs. DA-IE634301D246, SRI-5090,
Task IE634301D24603

Descriptors: (*Speech transmission, Intelligibility), (*Intelligibility, Psychometrics), (*Voice communi cation systems, Intelligibility), Automation, Speech.

Identifiers: Evaluation.

The report covers the progress made and the conclusions reached during the final six months of effort on the development of a speech intelligibility test compatible with automated procedures for testing. Development of test materials is described, test materials are presented, and their properties are discussed. A novel method for generating test forms is described, and the theoretical properties of this test procedure are fully developed and compared to more conventional procedures. The test materials and procedures are evaluated and empirically compared with two other types of intelligibility tests. It is concluded that these materials and procedures offer significant advantages over previous intelligibility tests. The need for improvement of these materials is recognized, and specific recommendations for research leading to such improvement are given. (Author)

N66-14967 **Field 17B**
CFSTI Prices: HC$3.00 MF$0.75
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena
SPACE PROGRAMS SUMMARY NO. 37-36. VOLUME III. FOR THE PERIOD SEPTEMBER 1, 1965 TO OCTOBER 31, 1965. THE DEEP SPACE NETWORK.
30 Nov 65, 80p
Contract NAS7-100
NASA CR-69196

Descriptors: (*Space communication systems, Design).

Identifiers: DSIF (Deep space instrumentation facility).

Patent 3,228,281 **Field 17G, 15A**
TACTICAL NAVIGATION DISPLAY SYSTEM.
Patent assigned to Navy,
by Pliny G. Holt. 11 Jan 66

Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Display systems, Navigation), Navigation computers, Airborne, Ground position indicators.

A single display apparatus is provided for an aircraft in which a ground track indicator can be superimposed by tactical situations, in which the position and bearing of the aircraft relative to any one of a plurality of ground positions pertinent to the tactical situation can be computed and displayed at any time during an aircraft mission. Sonobuoy placement and detection apparatus can be received and displayed for carrying out an ASW mission. The pilot and crew are enabled to carry out complex missions rapidly and precisely without excessively adding to their responsibilities.

Patent 3,228,292 **Field 17E, 15B**
FILTER WHEEL FOR PORTABLE INFRARED DETECTOR.
Patent assigned to Army,
by Hugh R. Carlon and Harvey Tannenbaum. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Infrared detectors, Infrared filters), (*Infra ed filters, Infrared detectors), Portable, Gas detectors, Nerve agents, Patents.

The instrument provides a visual and aural alarm in the presence of a nerve gas in the atmosphere. The infra-red band absorption filter has a strong absorption band in the range 9.2 to 10.4 microns. It includes a thin film of polyethylene which has impregnated in it a finely ground talc of a particle size generally less than 3 micros in diameter. The device is an improvement over the one disclosed in Carpenter et al patent No. 2,930,893.

Patent 3,228,337 **Field 17B, 16D**
RADIO FREQUENCY FREE COMMUNICATION SYSTEM.
Patent assigned to Navy,
by Rodney E. Grantham and Morton Stimler. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Light communication systems, Lasers), (*Guide missiles, Light communication systems), Patents, Guide missile safety, Modulators, Fuze functioning elements, Control systems.

The system is designed for communication between an aircraft and a missile which it is carrying. The system includes a modulator and a laser carried on the aircraft. The modulated output of the laser is used to activate components in the missile. The structure blocks out all radio frequency radiation.

Patent 3,229,102 **Field 17C, 17G**
RADIATION DIRECTION DETECTOR INCLUDING MEANS FOR COMPENSATING FOR PHOTOCELL AGING.
Patent assigned to NASA,
by Paul R. Spencer, Seymour Salmirs andErnst F. Germann, Jr. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Space navigation, Solar radiation), (*Solar radiation, Direction finding), Patents, Solar cells, Phototubes, Alignment, Monitors, Control systems, Spacecraft, Guidance, Celestial navigation.

Identifiers: Solar sensors.

The solar sensor serves to orient missions in space by providing a space vehicle control system with an electrical signal that is proportional to the angle of incidence between the sun and a reference axis on the space vehicle to be oriented. The control system amplifies this signal to obtain the magnitude and sense of reaction torque required for vehicle alignment with respect to the solar disk. The system involves the use of a flat base and a plurality of planar photocells.

Patent 3,229,245 **Field 17A**
ECHO RANGING DISPLAY SYSTEM.
Patent assigned to Navy,
by Burton G. Hurdle and Robert J. Mackey, Jr. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Display systems, Echo ranging), (*Echo ranging, Display systems), Digital systems, Patents.

The electronic chronometer system provides a digital display of the propagation time interval between particular portions of the transmitted sonar pulse and the received target echo. The system permits the insertion of instantaneous range rate information. That is, if the target is moving with respect to the sonar unit, and range rate information is available, the system may be utilized to 'track' the target and provide a compensated range indication at any given instant in time. Structurewise, the system includes a pulse oscillator, an electronic pulse counter and an electromechanical switch with selected gating circuitry for initiating and interrupting the operation of the system.

PB-169 314 **Field 17G, 20N**
CFSTI Prices: HC$2.00 MF$0.50
Systems Research and Development Se vice, Federal Aviation Agency, Washington, D. C.
INSTALLATION CRITERIA FOR CAPTURE EFFECT GLIDE SLOPE.
Technical rept.,
by Henry H. Butts. Dec 65, 38p Rept. no. RD-65-115
Proj. 320-101-01N

Descriptors: (*Glide path systems, Radio transmission), (*Radio transmission, Glide path systems), (*Naviga tional aids, Glide path systems), Terrain, Radiofrequency interference, Radio signals, Propagation, Antenna radia tion patterns, Air traffic control terminal areas, Electro magnetic compatibility.

The general theory of the capture effect glide slope which is useful at problem sites is described. Radiation patterns are plotted showing the cancellation techniques employed for eliminating energy striking discontinuities in the approach area so as to provide improvement in flyability. Details are given for generating the auxiliary signal, slightly offset in carrier frequency, which insures adequate clearance below path without derogating the flyability. A monitoring system for the new array is described in detail. (Author)

PB-169 323 **Field 17B, 22B**
CFSTI Prices: HC$11.60 MF$0.75
Aerospace Corp., El Segundo. Technical Operations.
COMMAND AND DATA ACQUISITION STATION STUDY FOR OPERATIONAL METEOROLOGICAL SATELLITES,
by R. W. Slocum. 12 Aug 64, 120p ATN-64 (7060)-1
Contract Cwb-10857

Descriptors: (*Meteorological satellites, Satellite tracking systems), (*Command + control systems, Satellite tracking systems), (*Satellite tracking systems, Meteorological satellites), Ground support equipment, Site selection, Radio equipment, Data processing systems, Telemeter systems, Electromagnetic compatibility.

Identifiers: TIROS.

At the request of the National Weather Satellite Center, a series of studies were carried out related to the Command and Data Acquisition (CDA) stations that will be used for the Tiros Operational System (TOS). The studies were concerned with the following questions: (a) What is the best location for an East Coast CDA station, and what type of antenna is recommended; (b) At the Gilmore Creek (Alaska) site, is there a need for a backup antenna, radome, and other necessary associated equipment. This document is a report on these studies. It is divided into two parts, the first part dealing with the East Coast site and the second, with the GILMOR site. Each part begins with a discussion of the problems and the ground rules set by NWSC; these are followed by analyses and results. (Author)

PB-169 594 **Field 17I, 9E**
CFSTI Price: HC$19.40
Armour Research Foundation, Chicago, Ill.
ANALYTICAL AND EXPERIMENTAL STUDIES OF SPHERICAL RIGID GROUND RADOMES.
Final rept.,
by Eugene Sevin. Feb 61, 198p ARF-8154
Contract AF 30 (602)-1860,
Proj. AF-4158,
Task 45384
RADC TR-60-261,
AD 254 188

Descriptors: (*Radomes, Design), Spheres, Buckling (Mechanics), Wind, Loading (Mechanics), Structural shells, Expanded plastics, Isocyanate plastics.

This report presents the final results of a two-phase study related to the design of rigid ground radomes. The first phase, an engineering review, was an evaluation of existing methods of structural analysis that have been applied in the design of hemispherical and three-quarter spherical radome shells of space frame, sandwich, and flanged shell constructions. The major findings of this evaluation relate to the apparent lack of applicable solutions to shell bending theory and to the highly approximate methods of stability analysis. The second and major phase of the study was the design and implementation of experiments on a true structural model of a three-quarter spherical radome of a rigid polyurethane foam material subjected to a specified wind loading distribution. As part of the experiment design, a unique and versatile method of wind load simulation was devised. A series of tests were performed on a 38-in.-O.D. shell of nominal radius-to-thickness ratio r/t = 48. Wind loads up to a stagnation pressure of 6 psi were applied without damaging the shell. The measured deflections at this loading were 80% of the shell thickness at the apex and 53% of the thickness at the stagnation point.

18. NUCLEAR SCIENCE AND TECHNOLOGY

AD-452 163 **Field 18H**
CFSTI Price: HC$1.60
Army Materials Research Agency, Watertown, Mass.
THE RESPONSE OF X-RAY FILMS TO INDIUM-116 BETA RADIATION FROM NEUTRON-ACTIVATED INDIUM FOILS.
Technical rept.,
by Arnold W. Schultz. Oct 64, 17p AMRA TR-64-30

Descriptors: (*Radiographic film, Radioactive decay), (*Indium, Radiography), Beta decay, Fluorescent screens, Thermal neutrons, Neutron reactions, Half life, Photographic images, Reliability, Photographic film.

The characteristic curves, relative speeds, and image unsharpnesses have been determined for Kodak X-ray film types KK, AA, and M, and type F alone and in combination with six fluorescent intensifying screens to meet our needs in neutron radiography studies. The density ranges consi-

dered were 1.0 to 2.5 for the combination film and screens and 0.3 to 3.0 for the films alone, for exposure to diffuse beta radiation from 54-minute indium-116. The beta-ray characteristic curve shapes are in good agreement with curve shapes reported using 200-kv X rays, while the filmscreen combinations have curve shapes that differ. (Author)

BMI-1742 (Del.) **Field 18J**
CFSTI Prices: HC$0.75 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING AUGUST 1965,
by Russell W. Dayton and Stan J. Paprocki. 1 Sep 65, 34p
Contract W-7405-eng-92

Descriptors: (*Reactor fuels, Gas-cooled reactors), (*Reactor materials, Fast neutrons).

BMI-1745 **Field 18J**
CFSTI Prices: HC$0.75 MF$0.50
Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING SEPTEMBER 1965,
by Russell W. Dayton and Stan J. Paprocki. 1 Oct 65, 31p
Contract W-7405-eng-92

Descriptors: (*Reactor fuels, Gas-cooled reactors), (*Reactor materials, Reactor fuel plates).

C13.10-260-9 **Field 18H**
CFSTI Price: MF$0.50
National Bureau of Standards, Washington, D. C. Inst. for Basic Standards.
STANDARD REFERENCE MATERIALS: HALF LIVES OF MATERIALS USED IN THE PREPARATION OF STANDARD REFERENCE MATERIALS OF NINETEEN RADIOACTIVE NUCLIDES ISSUED BY THE NATIONAL BUREAU OF STANDARDS,
by S. C. Anspach, L. M. Cavallo, S. B. Garfinkel, J. M. R. Hutchinson and C. N. Smith. 15 Nov 65, 18p NBS Miscellaneous Pub-260-9
Availability: Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.15.

Descriptors: (*Radioactive isotopes, Standards), (*Half life, Radioactive isotopes), Nuclei, Calcium, Cerium, Cobalt, Iodine, Krypton, Manganese, Mercury, Niobium, Promethium, Scandium, Sodium, Strontium, Thallium, Yttrium, Zinc.

Values are given for the half lives of materials used in the preparation of standard samples of Na (22), Ca (45), Sc (46), Mn (54), Co (57), Co (60), Zn (65), Kr (85), Sr (85), Sr (89), Sr (90), Y (88), Nb (95), I (125), Ce (139), Ce (141), Pm (147), Hg (203), T1 (204). Instrumentation, source preparation, and the determination of impurities are also discussed. (Author)

IDO-14667 **Field 18J**
CFSTI Prices: HC$2.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
BURNUP DETERMINATION OF NUCLEAR FUELS.
Project rept. for the quarter 1 Jul-30 Sep 65,
by William J. Maeck and James E. Rein. Dec 65, 48p
Contract AT (10-1)-205

Descriptors: (*Reactor fuels, Fuel burn up), (*Fuel burn up, Fission products).

IDO-16871-5 **Field 18D, 18G, 18I, 18M**
CFSTI Prices: HC$5.00 MF$1.00
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
FUNDAMENTALS IN THE OPERATION OF NUCLEAR TEST REACTORS. VOLUME 5. ADVANCED TEST REACTOR DESIGN AND OPERATION.
Nov 65, 187p
Contract AT (10-1)-205

Descriptors: (*Test reactors, Reactor operation), (*Reactor control, Test reactors).

IDO-17036 **Field 18I**
CFSTI Prices: HC$4.00 MF$0.75
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
SPERT III REACTOR FACILITY E-CORE REVISION,
by J. Dugone. Nov 65, 124p
Contract AT (10-1)-205

Descriptors: (*Pressurized water reactors, Reactor kinetics), (*Reactor cores, Pressurized water reactors).

Identifiers: Spert III.

IDO-17096 **Field 18I, 18J, 9B**
CFSTI Prices: HC$3.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
MACABRE,
by M. L. Griebenow and K. R. Dickey. Nov 65, 54p
Contract AT (10-1)-205

Descriptors: (*Programming (Computers), Reactor coolants), (*Reactor fuel elements, Heat transfer).

Identifiers: Macabre.

IDO-17128 **Field 18G, 18I**
CFSTI Prices: HC$4.00 MF$0.75
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
SAMPLING AND ANALYSIS OF FISSION PRODUCTS DURING THE LOSS-OF-FLUID TEST (LOFT).
Interim rept.,
by B. R. Hunter, E. L. Murri, and G. B. Matheney. Dec 65, 114p
Contract AT (10-1)-205

Descriptors: (*Fission products, Containment), (*Pressurized water reactors, Reactor accidents).

Identifiers: LOFT.

IDO-17131 **Field 18M, 5I**
CFSTI Prices: HC$1.00 MF$0.50
Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
SHIFT CREW PERFORMANCE EVALUATION AT NUCLEAR TEST REACTORS,
by R. J. Nertney. Dec 65, 17p
Contract AT (10-1)-205

Descriptors: (*Test reactors, Engineering personnel), (*Engineering personnel, Performance (Engineering)).

K-1649 **Field 18J, 18B**
CFSTI Prices: HC$4.00 MF$0.75
Oak Ridge Gaseous Diffusion Plant, Tenn.
ORGDP FULL REPROCESSING STUDIES.
Summary progress rept. 64-65,
by S. H. Smiley, D. C. Brater, and J. H. Pashley. 29 Oct 65, 104p
Contract W-7405-eng-26

Descriptors: (*Reactor fuel enrichment, Recovery), (*Gaseous diffusion separation, Reactor fuel processing).

ORNL-3872 **Field 18I, 18J**
CFSTI Prices: HC$5.00 MF$1.00
Oak Ridge National Lab., Tenn.
MOLTEN-SALT REACTOR PROGRAM SEMIANNUAL PROGRESS REPORT FOR PERIOD ENDING AUGUST 31, 1965.
Dec 65, 163p
Contract W-7405-eng-26

Descriptors: (*Liquid metal cooled reactors, Nuclear engineering), (*Reactor materials, Nuclear physics laboratories).

Patent 3,228,886 **Field 18J**
METHOD OF PREPARING COMPACTIBLE THORIUM OXIDE-PLUTONIUM OXIDE PARTICLES.
Patent assigned to AEC,
by Milton H. Lloyd. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reactor fuel elements, Preparation), Thorium compounds, Plutonium compounds, Oxides, Breeder reactors, Patents.

The combined oxides may be used in fuel elements for breeder or converter nuclear reactors. Plutonyl nitrate is added to an aqueous suspension of dispersible thorium oxide, the pH is adjusted to from 2.5 to 4.0 and the mixture is digested until a sol is formed. The sol is evaporated and the gel fragments are fired at 1000 degrees C.

Patent 3,229,091 **Field 18D**
SCINTILLATION SELECTOR FOR LOW ENERGY CHARGED PARTICLES.
Patent assigned to Navy,
by Kenneth F. Sinclair. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Scintillation counters, Charged particles), Patents, Beta particles, Photomultipliers.

A proportional multiplier is coupled with a scintillation counting device in appropriate combination to detect and count low-energy charged subatomic particles, such as beta particles. The proportional multiplier portion of the combination imposes across the radioactive gas, which is being examined for the presence therein of the low-energy charged particles, an electric field which acts to accelerate the 'primary ions' produced by the interaction of the (original) beta particles with atoms/molecules of the radioactive gas so that these primary ions 'collide' with still other atoms/molecules of the radioactive gas to produce 'secondary ions' which, in turn, are accelerated and produce further secondary ion multiplication.

PB-169 640 **Field 18F**
CFSTI Prices: HC$4.60
Naval Radiological Defense Lab., San Francisco, Calif.
PENETRATION OF PLANE NORMAL AND PLANE SLANT GAMMA RAYS THROUGH SLABS OF ALUMINUM AND STEEL. II. ANGULAR AND ENERGY SPECTRA (PHOTON NUMBER FLUX).
Research and development technical rept.,
by N. E. Scofield and L. G. Haggmark. 25 Oct 60, 45p USNRDL-TR-475
Proj. S-F011-05-11
AD 248 919

Descriptors: (*Shielding, Gamma rays), (*Aluminum, Gamma rays), (*Steel, Gamma rays), (*Gamma rays, Penetration), Thickness, Gamma-ray scattering, Photons, Gamma-ray absorption coefficients, Photon bombardment, Radioactive isotopes, Radiation damage, Scattering.

In passing through a slab of metal a narrow beam of gamma rays may be weakened by either complete absorption of the photon's energy or by a partial absorption and a scattering out of the beam. When a broad beam of radiation is passing through the slab much of this out-scattered radiation which is lost to the narrow beam is replaced at a position in the beam behind the slab by radiation in-scattered by beams penetrating neighboring areas of the slab. In practical shielding calculations the increase in the broad-beam dose or energy due to the in-scattered radiation is accounted for by the use of dose or energy build-up factors. These factors in turn may most readily be computed from the description of the scattered photons. This description should give, for any slab thickness and material and source energy and geometry, the number, energy and direction of the scattered photons. This is the quantity reported here.

19. ORDNANCE

AD-467 538 **Field 19A**
CFSTI Prices: HC$8.60 MF$0.75
Genistron, Inc., College Park, Md. Applied Research Div.
DETERMINATION OF RESPONSES OF PROTECTED AND UNPROTECTED ELECTRIC INITIATORS TO ELECTRICAL STIMULI, THEORY, PARAMETERS AND MEASUREMENT METHODS.
Special technical rept.
4 Jun 65, 84p Rept. no. 2400-5754-1
Contract N178-8290

Descriptors: (*Explosive initiators, Electromagnetic yields), (*Electromagnetic shielding, Explosive initiators), Hazards, Radiofrequency pulses, theory, Test methods.

In general, the effectiveness of in-line devices for protection of electric initiators from radio frequency electromagnetic hazards depends upon absolute parameters of the loaded devices plus parameters of the external electrical circuits. The absolute parameter 'minimum insertion loss' has been defined and its determination has been derived. This parameter is independent of generator source impedance. Definitions and methods of measurement of transfer functions and impedances required for its calculation are described. The application of each of the device parameters to assist in making a choice among available protective devices is described, and examples of use of the parameters are given, illustrating the direct comparison of protective devices for worst-case application. Appendix I contains a derivation of an exact solution for the critical source impedance which produces minimum insertion loss for a given loaded protective device at a given frequency. Appendix II contains a description of a simple graphical method for determining minimum insertion loss. (Author)

AD-467 628 **Field 19A, 9A**
CFSTI Prices: HC$3.60 MF$0.50
Genistron, Inc., College Park, Md. Applied Research Div.
DETERMINATION OF RESPONSES OF PROTECTED AND UNPROTECTED ELECTRIC INITIATORS TO ELECTRICAL STIMULI. A FRANKLIN INSTITUTE 34.5 CM FERRITE ATTENUATOR.
Special technical rept.
30 Jul 65, 32p Rept. no. 2400-5754-6
Contract N178-8290

Descriptors: (*Explosive initiators, Electromagnetic fields), (*Electromagnetic shielding, Explosive initiators), Radiofrequency pulses, Attenuators, Ferrites.

Identifiers: Ferrite (Electronics).

A single sample of the Franklin Institute 34.5 cm. ferrite attenuator was evaluated by Genistron over the frequency range from 100 cps to 10 gc. The unit was packaged as a protective device and tested to determine RF operating characteristics. Quantities measured directly were input impedance, load impedance of the connected inert MK-1 squib, transfer impedance and/or voltage attenuation = 20 log Vsubi/Vsubp. These data were used to compute the evaluation parameters Power Attenuation and minimum possible Insertion Loss, which are presented in graphic form. The measured time delay of 22 microseconds is also shown in an oscilloscope photograph. (Author)

AD-468 174 **Field 19A, 9A**
CFSTI Prices: HC$3.60 MF$0.50
Genistron, Inc., College Park, Md. Applied Research Div.
DETERMINATION OF RESPONSES OF PROTECTED AND UNPROTECTED ELECTRIC INITIATORS TO ELECTRICAL STIMULI. WESTON 50-WATT LOW BANDPASS TRANSFORMER.
Special technical rept.
6 Aug 65, 36p Rept. no. 2400-5754-8
Contract N178-8290

Descriptors: (*Explosive initiators, Electromagnetic fields), (*Electromagnetic shielding, Explosive initiators), Radiofrequency pulses, Transformers.

The effectiveness of two samples of a Weston 50-Watt Low Bandpass Transformer against electromagnetic fields was measured over the frequency range from 100 cps to 10 gc. The effectiveness of each device is reported in terms of power attenuation, and minimum possible insertion loss. Directly measured data from which these evaluation parameters were computed is reported in tabular form. (Author)

AD-468 317 **Field 19A, 9A**
CFSTI Prices: HC$6.60 MF$0.75
Genistron, Inc., College Park, Md. Applied Research Div.
DETERMINATION OF RESPONSES OF PROTECTED AND UNPROTECTED ELECTRIC INITIATORS TO ELEC- TRICAL STIMULI.
26 Jul 65, 70p Rept. no. 2400-5754-5
Contract N178-8290
Special technical rept. on the RF Densensitized PNPN Switch.

Descriptors: (*Explosive initiators, Electromagnetic fields), (*Electromagnetic shielding, Explosive initiators), Radiofrequency pulses, Electronic switches.

Five samples of the RF desensitized PNPN switch were evaluated by Genistron. The units were first tested to determine dc and low frequency characteristics. Following these tests each unit was packaged as a protective device and tested to determine RF operating characteristics. Quantities measured directly were input impedance load impedance of the connected inert MK-1 squib transfer impedance and/or voltage attenuation. These data were used to compute the evaluation parameters Power Attenuation and minimum possible Insertion Loss. (Author)

Patent 3,228,299 **Field 19F**
BIAS ADJUSTMENT FOR SPOTTING RIFLES.
Patent assigned to Army,
by Andrew J. Grandy. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Spotting rifles, Alignment), Gears, Patents.

The adjustment device permits adjustment of the axis of a spotting rifle with respect to the axis of a large gun. Toothed gears, one for elevation, changes and the other for deflection or azimuth changes have their teeth of progressively different depths so that a supporting guide ring engages each such gear at opposite positions, which are 90 degrees from the other gear. The gears are so constructed that the depth of teeth on one side increases while those opposite decrease on movement of a gear in one direction and the opposite occurs on movement of the gear in an opposite direction.

Patent 3,228,331 **Field 19D**
DETONATION ARRESTER FOR LIQUID DETONABLE SUBSTANCES.
Patent assigned to Navy,
by Bernard E. Drimmer. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Detonations, Inhibition), Liquids, Explosive materials, Shock waves, Patents.

An explosion being propagated along a conduit containing fluid high explosive is quenched by creating an explosion barrier by shock compressing a portion of the fluid high explosive, downstream of the detonation wave front, to a pressure region within which propagation is normally not maintainable. The shock wave resulting from the detonation of an explosive or detonatable fluid is used to prevent propagation of the detonation in the event of an undesired explosion.

Patent 3,228,336 **Field 19A**
ROD WARHEAD.
Patent assigned to Navy,
by Marvin L. Kempton. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Projectiles, Antiaircraft ammunition), Rods, Rings, Shaped charges, Deformable projectiles.

A plurality of rods and a shaped explosive charge are utilized. The rods are joined at their end-portions in a manner such that the detonation of the explosive charge expands the connected rods at high velocity into a substantially continuous loop or ring for projection into a target for the purpose of increasing the probability of 'kill' or destruction of the target. The explosive charge is shaped by an innerliner or a filler of inert material.

Patent 3,228,370 **Field 19H, 9C**
ELECTRICAL CONTROL SYSTEMS.
Patent assigned to Navy,
by Thomas A. Daly and Stephen Kowalyshyn, Jr. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Torpedoes, Control systems), Batteries+components, Velocity, Circuits, Patents.

The electrical control system is for use with torpedoes. A system of batteries is provided for supplying electric energy to the propulsion motors. An arrangement is shown for connecting the batteries either in series or in parallel circuit relation to provide two predetermined speeds of operation of the torpedo. An arrangement is also shown for automatically normalizing the current which is supplied to auxiliary utilization circuits.

Patent 3,229,093 **Field 19A, 14B**
INFRARED FUZE TARGET SIMULATOR.
Patent assigned to Navy,
by Robert S. Tarutvetter. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Thermal targets, Simulators), Infrared detectors, Infrared radiation, Patents, Fuzes (Ordnance), Projectiles, Simulation.

The target simulator has a large flat infrared radiating body and an infrared detector placed in the path of radiation from the body with a rotating disc having an aperture therethrough placed between the target and the infrared source to simulate a rotating jet projectile. A shutter is located in the in-

frared path for passing the infrared radiation therethrough for a predetermined time to simulate the passing of the target through the field of the detector.

Patent 3,229,123 **Field 19A**
SQUIB SIMULATOR.
Patent assigned to Navy,
by Warren R. Wood. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Explosives initiators, Simulators), Circuits, Tantalum capacitors, Pyrotechnics.

The circuitry provides a pulse shape similar to that developed in the electrical circuit of a pyrotechnic squib when such electrical circuit is energized and the squib is fired. Instead of the infinite rise time and the asymptotic decay time of a pulse produced by a normal R-C circuit, the current response of the R-C circuit having a tantalum capacitor provides a finite rise time, a rounded peak and a fast fall-off or delay time which is characteristic of the current pulse in the usual pyrotechnic squib circuit.

Patent 3,235,993 **Field 19F**
EJECTOR-EXTRACTOR MECHANISM FOR REPEAT- ING AUXILIARY FIREARM OF PUMP ACTION TYPE.
Patent assigned to Army,
by Robert F. Magardo. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Ejectors (Ordnance), Small arms), Patents, Rifles, Cartridge case extractors.

The auxiliary firearm is designed for mounting to a conventional shoulder arm to give increased fire power. The repeating auxiliary firearm is light in weight and compact in construction. A multiple purpose ejector mechanism is provided which serves as an ejector, an extractor and a cartridge retainer. A coil torque spring is utilized for compact construction.

Patent 3,235,995 **Field 19F, 13E**
CARTRIDGE RETAINING DEVICE FOR LIPLESS MAGAZINES.
Patent assigned to Army,
by Frederick P. Reed. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Feed mechanisms, Cartridges), (*Fastenings, Cartridges), Patents, Small arms.

The cartridge holding device is for the magazine of a shoulder type firearm. It consists of a cord or tape that loops over the leading cartridges in the magazine. The cord is severable or disconnectable, when pulled, to release the cartridge.

Patent 3,236,181 **Field 19A**
PRIMER ASSEMBLY.
Patent assigned to Army,
by William B. Woodring, Richard J. Shellnutt, Merton L. Robinson, and Paul S. Foster. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Primers, Cartridges), Cartridge cases, Patents.

The primer assembly structure is useful in cartridge cases of all calibers including even the smallest. The structure involves an improved anvil configuration in the head of a case to obtain both longitudinal and lateral support for the anvil while maintaining the necessary communication at the flash hole between the priming composition and the charge of propellant in the charger case.

Patent 3,236,183 **Field 19A**
PROJECTILE.
Patent assigned to Army,
by Frank W. Littleford. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Projectiles, Training ammunition), Patents, Standardization, Design, Logistics.

The projectile is designed for target practice and has parts which are interchangeable for use either as tracer or non-tracking items. The body has a forward closed end nose portion and an open end base portion. The base portion has a central passage that communicates with a smaller central void within the body. An open ended, reversible base plug is secured within the central passage. The plug has a continuous lateral surface extending the full length of the passage.

Patent 3,236,704 **Field 19A**
PROPELLANT COMPOSITION.
Patent assigned to Army,
by Sydney Axelrod and George Demitrack. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Cartridge cases, Combustion), Ammunition propellants, Plastics, Binders, Patents, Nitrocellulose.

The composition is for a combustible cartridge casing. It consists of about 90 percent by weight of a granular nitrocellulose base propellant intimately mixed and dispersed in about 10 percent by weight of a plastic. The plastic consists of cross-linked, three-dimensional polymers.

Patent 3,236,834 **Field 19A, 21I, 7C**
METHOD FOR THE CATALYTIC REDUCTION OF B-CYANOETHYL CELLULOSE TO AN AMINOPROPYL CELLULOSE.
Patent assigned to Army,
by Louis M. Soffer. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Propellants, Reduction (Chemistry)), (*Reduction (Chemistry), Propellants), Patents, Catalysis, Catalysts, Ethyl cellulose.

The product is for use as a constituent of fast burning powders for hypervelocity guns or rocket propellants. Cyanoethyl cellulose is mixed with ethylene glycol and is then reduced with hydrogen in the presence of a Raney nickel catalyst at from 125 to 150 degrees C. and at a pressure of at least 150 pounds per square inch.

PB-169 202 **Field 19H**
CFSTI Prices: HC$3.00 MF$0.75
Naval Ordnance Test Station, China Lake, Calif.
MOTION EQUATIONS FOR TORPEDOES,
by Louis A. Lopes. 12 Feb 54, 64p NOTS-827 NAVORD 2090,
AD 35 238

Descriptors: (*Torpedoes, Equations of motion), (*Equations of motion, Torpedoes), Potential theory, Model tests, Hydrodynamis, Computers.

Motion equations are developed for a rigid torpedo of constant mass with six degrees of freedom. It is assumed that the medium is at rest except for the motion caused by the torpedo. The mathematical form of the 'mass accession' forces is derived from potential theory. The motion equations are referred to body coordinates in their development, and transformations are made to inertial coordinates. Some sources of hydrodynamic coefficients are discussed, and an outline of the methods for obtaining them from model tests is presented. Solutions of steady-state equations are given, as well as a brief explanation of the analog computer method of solving the motion equations. (Author)

PB-169 204 **Field 19H**
CFSTI Prices: HC$3.00 MF$0.75
Naval Ordnance Test Station, China Lake, Calif.
THE STABILITY COEFFICIENTS OF STANDARD TORPEDOES.
Rept. for Mar 51-Aug 53,
by M. R. Bottaccini. 18 Jul 54, 98p NOTS-909 NAVORD 3346,
AD 54 134

Descriptors: (*Torpedoes, Stability), Hydrodynamics, Equations of motion, Boundary layer, Configuration, Roll, Fluid dynamic properties.

After some preliminary discussion of hydrodynamic considerations, simple equations are developed for the stability coefficients of standard torpedoes. Simplified equations of motion are presented, and a criterion for stability is obtained. Correction factors for wing-body interference, boundary-layer losses, and body shape are introduced into the coefficients. The behavior of a torpedo in roll is discussed, and the roll parameters are developed.

PB-169 310 **Field 19C, 5E**
CFSTI Prices: HC$2.00 MF$0.50
Human Engineering Labs., Aberdeen Proving Ground, Md.
AN EVALUATION OF THE HUMAN AND SPACE ENGINEERING STUDIES TANK, 90mm GUN, T42,
by Jerry R. Hollis. 10 Nov 53, 29p Technical memo. TM-3
Proj. TB1-1000
AD 63 044

Descriptors: (*Tanks (Combat vehicles), Human engineering), (*Human engineering, Tanks (Combat vehicles)), Checkout procedures, Specifications, Vehicle heaters, Ventilation, Operators (Personnel), Control systems.

Identifiers: T-42 tanks.

A checklist, in conjunction with a written commentary keyed to the checklist, was used to evaluate the proposed tank design from a human engineering viewpoint. While it appears that the checklist may be applicable for wider future use, it is emphasized that it has not yet been validated. This evaluation emphasized that even the most conscientious space and human engineering study cannot adequately answer many questions if the study has been limited to a paper presentation, and it is strongly recommended that future contracts provide an integration of the proposed design modifications in the form of a mock-up. (Author)

PB-169 311 **Field 19C, 5E, 5H**
CFSTI Prices: HC$4.00 MF$1.00
Human Engineering Labs., Aberdeen Proving Ground, Md.
SYSTEMS EVALUATION OF THE TANK 76mm GUN, M41A1,
by Martin I. Kurke and John A. Stephens. 8 Jan 57, 128p Technical memo. TM-1-57
Proj. TB1-1000-12
AD 126 990

Descriptors: (*Tanks (ombat vehicles), Human engineering), (*Human engineering, Tanks (Combat vehicles)), Systems engineering, Man-machine systems, Hatches, Seats, Guns, Loading, Firing tests (Ordnance), Protective clothing, Communication systems, Specifications.

Identifiers: M-41 tanks.

The study reports the methodology and results of an evaluation of the man-machine relationships in the 76mm Gun Tank, M41A1. A frequency index of operational use derived from service

school data was used in performing a job segment analysis. This, in conjunction with a detailed study of user crews operating a combat loaded M41A1 tank and the resulting recommendations comprise this evaluation. Of forty-one recommendations made, ten are concerned with improving the facility with which the crew enters and leaves the tank and uses the hatches. Three recommendations are concerned with the reduction of fatigue through improved seating. Five recommendations deal with operations while the vehicle is in motion. Sixteen recommendations are concerned with improving the efficiency of loading and firing the armament. One concerns the effect of arctic and other bulky clothing upon tank operations, and five recommendations concern problems of communication. Throughout the report an attempt is made to provide some optimum specifications to serve as a guide for future design. (Author)

20. PHYSICS

AD-402 828 **Field 20D, 21H**
CFSTI Price: HC$3.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
TASK R.
Quarterly progress rept. no. 16, 1 Jan-31 Mar 63. 31 Mar 63, 36p TG-331-16
Contract NOw-62-0604-c, ARPA Order-22-62

Descriptors: (*Gas flow, Dissociation), (*Dissociation, Gas flow), (*Rocket motor nozzles, Fluid mechanics), Nitrogen compounds, Nitrogen, Oxides, Oxygen, Argon, Carbon dioxide, Carbon compound, Infrared spectroscopy, Electron spin resonance, Propulsion, High-temperature research.

Dissociated gas studies and rocket nozzle fluid dynamics.

AD-406 875 **Field 20C**
CFSTI Price: HC$2.60
Laboratories for Applied Sciences, Univ. of Chicago, Ill.
ANGULAR ENERGY DISTRIBUTION OF PHOTOELECTRONS.
Quarterly progress rept. no. 3, 16 Oct 62-16 Jan 63,
by Jay Burns. Feb 63, 26p LAS-SR-224-12
Contract DA-44-009-eng-5004,
Task LAS-224

Descriptors: (*Photoelectrons, Cesium compounds), (*Hall effect, Photoelectric effect), (*Cesium compounds, Photoelectric effect), Photocathodes, Energy, Distribution, Impurities, Tests.

Initial test results on the experimental tube and associated apparatus are described together with certain changes suggested by the test results. Problems connected with making S-9 photocathodes by the atomic beam cesiation method have delayed angular distribution measurements. A tube is described which was built for experiments to correlate photoelectric properties with impurity concentrations in photocathodes as determined by Hall effect measurements. Certain theoretical aspects of the angular energy distribution are discussed. (Author)

AD-421 570 **Field 20L, 9A, 20C**
CFSTI Price: HC$1.60
Westinghouse Research Labs., Pittsburgh, Pa.
BASIC STUDIES ON THERMOELECTRIC MATERIALS.
Quarterly rept. no. 8.
Jun 63, 17p
Contract NObs-84687

Descriptors: (*Thermoelectricity, Materials), (*Semiconductors, Thermoelectricity), Magnetic fields, Theory, Mathematical analysis, Electrical conductance, Hall effect, Thermal conductivity, Measurement, Platinum alloys, Antimony alloys.

The results from an extension of the calculations previously presented on the effects of a magnetic field on the figure of merit of materials for thermoelectric and thermomagnetic devices are summarized. The main extension has been the use of exact statistics rather than assuming the non-degenerate case. Also the calculations have been extended to other cases besides the s = O case. A summary of the measurements on the transport properties of the compound PtSb2 is included.

AD-430 186 **Field 20L, 9A, 20C**
CFSTI Price: HC$1.60
Westinghouse Research Labs., Pittsburgh, Pa.
BASIC STUDIES ON THERMOELECTRIC MATERIALS.
Quarterly rept. no. 9.
Sep 63, 20p
Contract NObs-84687

Descriptors: (*Thermoelectricity, Materials), (*Semiconductors, Thermoelectricity), Bismuth alloys, Tellurium alloys, Anisotropy, Symmetry (Crystallography), Magnetic fields, Hall effect, Numerical analysis, Resistance (Electrical), Electrical fields, Magnetostriction.

Bi2Te3 is one of the most important thermoelectric materials. However, its band structure is only imperfectly understood. A summary is given of work in progress on the measurement of the magneto-resistance of n-type Bi2Te3. This work is expected to shed light on the importance of the anisotropy in the electron scattering in previous measurements of the band structure by magnetoresistance measurements and to provide information on the existence of a second conduction band. (Author)

AD-445 831 **Field 20L, 9A, 20C**
CFSTI Prices: HC$9.60
Westinghouse Research Labs., Pittsburgh, Pa.
BASIC STUDIES ON THERMOELECTRIC MATERIALS.
Mar 64, 94p Quarterly rept. no. 11
Contract NObs-84687

Descriptors: (*Thermoelectricity, Materials), (*Semiconductors, Thermoelectricity), Platinum alloys, Antimony alloys, Bismuth alloys, Tellurium alloys, Transport properties, Band theory of solids, Crystal structure.

There are three topics currently being pursued on this contract. Two of them are studies intended to provide a better understanding of the particular properties in a solid which make it a good thermoelectric materials. The third is a study of the relation between the figure of merit for a material in a Nernst-Ettinghausen type device and the fundamental properties of the material such as carrier mobilities, type of scattering, energy gap, and lattice thermal conductivity. In order to gain sufficient insight into the transport properties of materials to enable one to get a feel for what the transport properties of new or unknown materials might be, it is necessary to understand the band structure of a number of materials with widely different crystal structures. We are presently investigating the structure of two materials--Bi2Te3 and PtSb2. We are studying Bi2Te3 because it is a well-known thermoelectric material and because its band structure is not well established at the present time. We are studying PtSb2 because its crystal structure is quite different from materials studied previously, but its structure has a high enough symmetry that theoretical calculations of the band structure are not too difficult.

AD-447 652 **Field 20M, 9B**
CFSTI Prices: HC$6.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
ADDITIONS AND IMPROVEMENTS TO THE APL IBM 7094 HEAT TRANSFER COMPUTER PROGRAM,
by R. P. Suess. Sep 64, 64p TG-602
Contract 62-0604-C

Descriptors: (*Heat transfer, Programming (Computers)), (*Programming (Computers), Heat transfer), Aerodynamic heating, Wind tunnels, Stagnation point, Recording systems, Temperature, Radomes, Thermal stresses.

Although the program is quite flexible, effort is continually being made to improve and increase the scope of the program. It is the purpose of this report to describe five important changes and additions to the program. A description is given of the additional FORTRAN programming needed to take advantage of the new features, but the detailed programming which went into the changes and improvements is omitted. In the discussions which follow, a familiarity with the program will be assumed. Because of the diverse nature of each of the topics discussed, the report is broken into the following five distinct and separate sections: (I) Wind tunnel calculations; (II) Stagnation point heat transfer; (III) Automatic plotting of temperature data; (IV) Computation of radome thermal stresses, and (V) Throwing away of elements.

AD-449 189 **Field 20C**
CFSTI Price: HC$2.00
Aerojet-General Corp., Downey, Calif. Ordnance Div.
INVESTIGATION OF ELECTRIFICATION OF POWDERS IN FLOW THROUGH TUBES AND NOZZLES. I. A CHARGE ANALYZER.
Special rept.,
by T. G. Owe Berg, G. C. Fernish and W. J. Flood.
May 63, 43p Rept. no. SR-0395-04 (08)SP
Contract DA-18-108-405-cml-829

Descriptors: (*Powders, Static electricity), (*Measuring devices (Electrical + electronic), Design), Rheology, Aerosols, Airborne, Particles, Friction, Capillary tubes, Velocity, Nozzles, Voltage, Electrodes.

As a part of an investigation of the electrification of powders in flow through tubes and nozzles, a charge analyzer was designed, constructed, and tested. The charge analyzer has two electrodes at plus or minus 1000 volts with respect to ground. At a stationary state, the current from each electrode is equal to the rate of disposition of charge. The two currents are recorded and integrated with a planimeter. The electrodes are weighed on a micro-balance for determination of the amount deposited. The nozzle is located at one end of the pair of electrodes. Experiments were conducted with several airborne powders, in the range 1 to 30 microns of particle diameter, flowing through a hypodermic needle of 0.8 mm diameter and 3 ft. length of flow rates between 50 and 500 cc/min. The average positive charge, the average negative charge, and the average absolute charge are proportional to the square of the flow rate. The charge is all acquired in friction between the powder particles and a deposit on the tube wall. Average charges up to 0.01 C/g have been measured. The charge is smaller the greater the extent of agglomeration of the powder. It depends as much upon agglomeration as upon the nature of the powder. It follows that literature data on aerosol charges determined with samples in slow rectified flow, e.g., by a capillary tube or a slit system, are misleading and may be too low by many orders of magnitude. (Author)

AD-456 022 **Field 20E**
CFSTI Prices: HC$3.60
Korad Corp., Santa Monica, Calif.
GaAs LASER DIODES.
Quarterly progress rept. no. 1, 1 Jul-30-Sep 64,
by R. A. Sehr and W. J. Rundle. 30 Sep 64, 34p

Contract DA-28-043-AMC-00235 (E),
Proj. DA-1P6-22001-A-056

Descriptors: (*Lasers, Diodes (Semiconductor)), Gallium alloys, Arsenic alloys, Manufacturing methods, Diffusion, Thermal

properties, Fixed contacts, Bonding, Resistance (Electrical), Heat transfer, Test methods, Tests, Copper, Heat sinks.

Device development and laser diode fabrication are described. Experimental work, aimed at improved laser performance, has been concentrated primarily on diffusion experiments and methods of increasing electrical and thermal contact resistance. Procedures have been established for guarantying a junction flatness of plus or minus 0.05 micron, and a bonding technique developed which enables electrical contact resistivities of less than 0.00005 ohm sq cm. A new laser geometry has been tested, and a fabrication technique developed. The 20 laser diodes assembled and delivered during the report period were mounted on a coaxial copper heat sink. The fabrication and test methods utilized in this work are outlined. (Author)

AD-462 245 **Field 20E**
CFSTI Prices: HC$4.60
Redstone Scientific Information Center, Redstone Arsenal, Ala.
LASERS,
by Gus J. Caras. 30 Apr 64, 46p RSIC-195
N65 31612

Descriptors: (*Lasers, State-of-the-art reviews), (*Pumping (Optical), State-of-the-art reviews), Ruby, Atomic energy levels, Gas discharges, Liquids, Semiconductor devices, Excitation, Frequency, Bibliographies, Abstracts.

This state-of-the-art survey consists of two sections, a technical summary and a bibliography. Although the bibliography, which consists of 125 references and covers the period of 1 January 1963 to 31 December 1963 deals mostly with the subject of laser pumping, the summary reviews other topics of laser technology including a description of the various types of lasers and their potential applications. (Author)

AD-465 129 **Field 20K, 11D, 19D**
CFSTI Prices: HC$4.00 MF$0.75
Arnold Engineering Development Center, Arnold Air Force Station, Tenn.
STRESS WAVES IN COMPOSITE LAMINATES,
by Ray Kinslow. Jun 65, 114p AEDC-TR-65-69
Contract AF 40 (600)-1000,
Projs. AF-8871, ARO-VS3502,
Task 887101
Prepared in cooperation with ARO, Inc., Arnold Air Force Station, Tenn.

Descriptors: (*Laminates, Impact shock), (*Hyper velocity projectiles, Impact shock), Composite materials, Shock waves, Shock (Mechanics), Terminal ballistics.

Fractures caused by stress waves resulting from hypervelocity impact are sometimes reduced, and at other times are increased, by the use of laminated materials. An analysis of some of the parameters which affect the ability of a laminated structure to resist fracture following impact has been conducted. It is shown that there are multiple reflections from the interfaces bounding any layer of material. The amplitudes of these waves attenuate very rapidly, but because their transmitted components may combine in phase with other waves, they sometimes contribute substantially to the total stress produced. It is shown that these combined waves may result in a stress much greater in the laminated material than would have been produced by the same impact on a solid target of either of the materials used; however, under other conditions, the laminate may be employed to reduce the stress to a very small value. Pressure pulse amplitudes in materials having impedance mismatch values ranging from 0.1 to 10.0 and having as many as thirty laminations are presented in both graphical and tabular form. (Author)

AD-466 353 **Field 20H, 20M**
CFSTI Prices: HC$2.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
ELECTRODE HEAT TRANSFER IN THE ROTATED ARC.
Technical memo.,
by S. D. Raezer. Apr 65, 24p TG-674
Contract NOw-62-0604-c

Descriptors: (*Plasma generators, Electrodes), (*Electric arcs, Electrodes), (*Electrodes, Heat transfer), Cooling, Heating, Electric currents, Rotation, Melting.

The report discusses the problem of electrode cooling in plasma arcs. An approximation to the actual case of an electrode heated by a rotating arc column is obtained from the solution of the one-dimensional, periodic heating and cooling of a flat plate. The heating period of this plate is equal to the arc spot width divided by the linear arc velocity, and its cooling period is equal to the remaining electrode perimeter divided by the linear arc velocity. This approach allows an estimation of the practical limit of the arc current density as fixed by arc rotation rate and electrode perimeter. (Author)

AD-466 354 **Field 20D, 14B**
CFSTI Prices: HC$4.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
FLOW STUDIES IN A CONTOURED NOZZLE DESIGNED FOR A SMALL HELIUM HYPERSONIC WIND TUNNEL.
Technical memo.,
by F. F. Mark. Apr 65, 46p TG-677
Contract NOw-62-0604-c,
N65 29273

Descriptors: (*Hypersonic nozzles, Wind tunnel nozzles), (*Wind tunnel nozzles, Hypersonic nozzles), (*Hypersonic wind tunnels, Wind tunnel nozzles), Fluid mechanics, Helium, Instrumentation.

Pressure measurements were made in a contoured nozzle designed for a 2 inch Helium Hypersonic Wind Tunnel. This nozzle was designed to give a uniform Mach 18 flow at the test section. The investigation showed that the measured exit centerline Mach number was less than the design value and that a nonuniform flow existed in this region. These results were attributed to the boundary layer displacement thickness being considerably larger than estimated. Uniform Mach 14.7 flow was produced at a station about one-third of the nozzle length from the exit. The flow characteristics of this nozzle provide a basis for the evaluation of the techniques of estimating the viscous flow correction in small contoured nozzle. (Author)

AD-466 489 **Field 20D, 14B**
CFSTI Prices: HC$4.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
AN ANALYTICAL STUDY OF THE SUPERSONIC COMPRESSOR AS A MEANS OF OBTAINING HYPERSONIC FLOW SIMULATION AT LOW ALTITUDES.
Technical memo.,
by R. A. Makofski and W. P. Dickens. Apr 65, 50p TG-673
Contract NOw-62-0604-c

Descriptors: (*Rotary compressors, Hypersonic wind tunnels), (*Hypersonic flow, Simulation), (*Hypersonic flight, Test facilities), Aerodynamics, Thermodynamics.

A study of the potentialities of the supersonic compressor as a means of obtaining hypersonic flow simulation at low altitudes is presented. For compressors operating at tip speeds of about 2000 fps., an optimum simulation exists at a compressor supply temperature of about 600K and an inlet Mach number of 2. This optimum provides true temperature, sea level simulation at a test Mach number of 9. (Author)

AD-467 017 **Field 20A, 4A**
CFSTI Prices: HC$4.60 MF$0.50
Jason Div., Inst. for Defense Analyses, Arlington, Va.
LONG-RANGE ACOUSTIC PROPAGATION IN THE ATMOSPHERE.
Research paper,
by Wallace D. Hayes. 31 Jul 63, 43p RP-P-50, IDA/HQ-63-2014
Contract SD-50

Descriptors: (*Atmosphere, Acoustics), (*Acoustics, Atmosphere), (*Sound transmission, Atmosphere), Propagation, Geometry, Equations.

The purpose of this paper is to discuss the factors controlling the propagation of sound over long distances in our atmosphere. The principal method used is that of geometric acoustics, with the assumption that acoustic energy is transmitted along well-defined paths without diffraction in the same manner that electromagnetic energy is transmitted in geometric optics. The nature of sound sources is not considered in detail here, and the sound signal is considered to be known in a form appropriate for geometric acoustics.

AD-467 414 **Field 20J, 20C, 8E**
CFSTI Prices: HC$4.60 MF$0.50
Army Missile Command, Redstone Arsenal, Ala. Physical Sciences Lab.
CLASSICAL FIELDS AND GRAVITATION.
Technical rept.,
by Vitalij Garber and C. A. Coulter. 10 May 65, 44p
Proj. DA-1P014501B31A
AMC-RA RR-TR-65-5,
N65 35925

Descriptors: (*Field theory, Mathematical analysis), (*Gravity, Relativity theory), (*Relativity theory, Mathematical analysis), Physics, Theory, Symposia.

Graduate-level lectures given at the 1964 Summer Seminar in Theoretical Physics at Redstone Arsenal are presented. This report deals with classical field theory and gravitation. The discussion begins with consideration of the Lagrangian formalism in four-dimensional spacetime. Hamilton's principle is applied to obtain the Euler-Lagrange equations of motion. Criteria for Lorentz covariance are developed. Treatment of interacting fields by use of the Lagrangian formulation is illustrated by the consideration of charged particles in an electromagnetic field. Noether's theorem and its connection with conservation laws are outlined, and the application to the particular case of orthochronous Lorentz transformations is described. Following a review of gravitational experiments supporting the general theory of relativity, the concepts of gravitational and inertial mass equivalence, general covariance, the metric tensor, Riemannian space, and covariant differentiation are developed. The Bianchi identities are derived from the symmetry properties of the affine connection in the Riemannian metric space. Subsequently, gravitational field equations for gravitational fields only and in the presence of other fields are derived. The necessity for explicitly introducing an interaction term in the conventional and quantum mechanical theory is contrasted with the automatic, implicit interaction found in the gravitational field theory. Exact solutions are obtained for the spherically-symmetric Schwarzschild case. The approximate theory for the weak field case is discussed. (Author)

AD-470 550 **Field 20L**
CFSTI Prices: HC$3.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
UPPER AND LOWER BOUNDS FOR THE FREQUENCIES OF RECTANGULAR FREE PLATES.
Technical memo.,

by Norman W. Bazley, David W. Fox, and James T. Stadter. Aug 65, 36p TG-707
Contract NOw-62-0604-c

Descriptors: (*Rectangular bodies, Vibration), Differential equations, Mechanics, Theory, Flat plate models.

AD-471 882 **Field 20D, 14B**
CFSTI Prices: HC$3.60 MF$0.50
David Taylor Model Basin, Washington, D. C. Aerodynamics Lab.
A REVIEW OF AIR-FLOW VISUALIZATION BY MEANS OF MIST, SMOKE, AND DUST,
by James M. Lee. Oct 55, 36p AERO-883

Descriptors: (*Flow visualization, Aerodynamics), (*Laboratory equipment, Flow visualization), (*Test methods, Flow visualization), Smokes, Dust, Aerosols, Combustion.

AD-472 763 **Field 20E, 9A**
CFSTI Prices: HC$5.00 MF$1.00
RCA Labs., Div., Radio Corp. of America, Princeton, N. J.
LASER DIGITAL DEVICES.
Final rept., 1 Jul 63-28 Apr 65,
by Walter F. Kosonocky. Sep 65, 152p
Contract AF 30 (602)-3169,
Proj. AF-5581,
Task AF-558101
RADC TR-65-238

Descriptors: (*Lasers, Digital systems), Circuits, Gain, Switching circuits, Fluorescence, Phthalocyanines, Absorption, Semiconductors, Gallium alloys, Arsenic alloys.

Continuously pumped lasers are considered as components for digital circuits in which all of the processing signals are in the form of optical energy. The operation of the laser digital circuits is based on signal gain derived from a laser amplifier and nonlinear (saturable) response of optical materials to laser signals. The two nonlinear processes are quenching of the output of a laser oscillator and saturation of optical absorption. A simple two-energy-state model is used to relate the speed of operation of the laser digital devices to their material properties and the required energy density of the optical siggnals. The validity of this model to describe a large-signal response of laser material is verified by spectroscopic studies of saturation of absorption of the R lines of ruby and the singlet absorption bands of phthalocyanine solutions. The same model is also applied to describe the large-signal response of GaAs lasers. It is shown that semiconductor lasers are the most promising components for laser digital circuits. Measurements of both the near- and far-field emission patterns and the spectroscopic characteristics of GaAs lasers, oscillators, and amplifiers are reported. A laser inverter, laser bistable oscillator, and laser monostable oscillator are examined as switching devices that could be implemented with GaAs lasers. The GaAs laser inverter is further evaluated as a general-purpose switching circuit, and experimental tests of the operation of this device are reported. (Author)

AD-474 031 **Field 20K, 21I, 9B**
CFSTI Prices: HC$10.60 MF$0.75
Rohm and Haas Co., Huntsville, Ala. Redstone Arsenal Research Div.
APPLICATION OF THE FINITE ELEMENT METHOD TO STRESS ANALYSIS OF SOLID PROPELLANT ROCKET GRAINS, VOLUME I.
Special rept.,
by Eric B. Becker and John J. Brisbane. 18 Nov 65, 100p S-76
Contracts DA-01-021-ORD-12341 (Z), DA-01-021-AMC-11536 (Z)

Descriptors: (*Solid rocket propellants, Mechanics), (*Propellant grains, Stresses), (*Programming - (Computers), Propellant grains), (*Mechanics, Solid rocket propellants), Digital computers.

Identifiers: Stress analysis.

A series of computer programs based on finite element methods has been developed for the stress analysis of solid propellant rocket grains and similar geometric configurations. These programs have the capability of analyzing (1) a linear elastic, isotropic, axisymmetrically loaded, axisymmetric propellant grain with (or without) an orthotropic elastic motor case, (2) a linear elastic, isotropic, plane section with (or without) an orthotropic case, or (3) an axisymmetric, orthotropic shell. Loadings of arbitrarily varying pressure, body force, and thermal gradients are allowable. Extensive data generation and data output features are included in the programs to reduce both errors and effort involved in data preparation and data reduction. (Author)

AD-475 885 **Field 20D, 20M**
CFSTI Prices: HC$6.00 MF$1.25
Fluid, Thermal and Aerospace Sciences, Case Inst. of Tech., Cleveland, Ohio.
NATURAL CONVECTION IN A HORIZONTAL CYLINDER AT LARGE PRANDTL NUMBERS.
Scientific rept. for 1963-1965,
by Ernest R. Menold and Simon Ostrach. Nov 65, 202p FTAS/TR-65-4
Grant AF-AFOSR-194-66,
Proj. AF-9781,
Task 978101
AFOSR 65-2239

Descriptors: (*Convection (Heat transfer), Cylindrical bodies), (*Cylindrical bodies, Convection (Heat transfer)), (*Fluids, Convection (Heat transfer)), Oils.

The work deals with the natural convection of a fluid confined within an infinite horizontal cylinder, at large Prandtl numbers and unit order Grashof numbers. The fluid motion is generated by means of a cosine temperature distribution imposed circumferentially on the cylinder wall. An arbitrary phase angle is included in this distribution in order to investigate a variety of heating configurations ranging from the heated-from-the-side to the heated-from-below case. The governing equations are solved using a technique known as the 'modified Oseen linearization'. The mathematical simplifications inherent in a large Prandtl number analysis make it possible to scrutinize carefully this technique, and both its simplifications and shortcomings are discussed. Key assumptions in the analysis are carefully examined and ambiguities appearing in earlier work are pointed out. An experimental investigation of natural convection phenomena in a viscous silicone oil confined in a horizontal cylinder is made, and the results are compared with theory. The experimental equipment was designed so that a cosine temperature distribution could be maintained on the cylinder wall. (Author)

AD-476 149 **Field 20E, 9E**
CFSTI Prices: HC$5.60 MF$0.50
California Univ., Berkeley. Electronics Research Lab.
LASER ARRAYS,
by James Clark Gibson. 18 Jun 65, 52p ERL-65-21
Grants AF-AFOSR-139-64, AF-AFOSR-139-65

Descriptors: (*Lasers, Design), Theory.

Although there has been some investigation of the application of array techniques to laser arrays, it has been limited to very elementary models for the elements pattern, simple types of arrays, investigations of statistical variations between individual radiators, and problems involved with the partial coherence-of laser radiation. This paper deals in much more detail with the application of various types of array techniques. The laser is assumed to have a Gaussian field distribution at its aperture, and its far field pattern is developed from this aperture pattern. The linear broadside array factor is applied to both the Gaussian element pattern and to an element consisting of a circular aperture uniformly illuminated with a plane wave. The Dolph-Tchebyscheff and binomial amplitude distribution array factors are applied to the Gaussian element pattern to reduce sidelobe levels with equal element spacing. Ishimaru's technique of unequal element spacing is applied to the Gaussian element pattern to reduce sidelobes, and then to suppress the secondary beam. The half-power beamwidths are calculated and compared, and the circular array is investigated for application to the Gaussian element pattern. Results concerning relative sidelobe levels and grating lobe levels are tabulated and compared. Conclusions are made concerning the feasibility of applying array theory to lasers with element spacings of hundreds of wavelengths. (Author)

AD-491 094 **Field 20K**
CFSTI Price: HC$3.60
David Taylor Model Basin, Washington, D. C. Structural Mechanics Lab.
INELASTIC LOBAR BUCKLING OF CYLINDRICAL SHELLS UNDER EXTERNAL HYDROSTATIC PRESSURE.
Research and development rept.,
by Thomas E. Reynolds. Aug 60, 32p Rept. no. 1392
Proj. S-F013-03-02

Descriptors: (*Buckling (Mechanics), Structural shells), (*Cylindrical bodies, Structural shells), (*Stiffened cylinders, Buckling (Mechanics)), Differential equations, Hydrostatic pressure.

A solution to Gerard's differential equations for plastic buckling of cylincrical shells is found for the case of lobar buckling under hydrostatic pressure. An approximate formula based on this solution is then obtained for buckling in the inelastic region. According to this formula, the buckling pressure is a function of the cylinder geometry and the secant and tangent moduli as determined from a stress-strain intensity diagram for the shell material. Agreement with experiments on ring-stiffened cylinders is found to be within 4 percent. (Author)

C13.46:219 **Field 20N, 17B**
CFSTI Price: MF$0.75
Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
RADIO PATH LENGTH STABILITY OF GROUND-TO-GROUND MICROWAVE LINKS.
Technical note,
by M. C. Thompson, Jr. and H. B. Janes. 15 Nov 64, 72p NBS-TN-219
Hard copy available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.45.

Descriptors: (*Microwave communication systems, Radio waves), (*Radio waves, Propagation), Radio relay systems, Electromagnetic wave reflections, Refractive index, Colorado, Florida, Atmospheric refraction.

The Lower Atmosphere Physics Section of the National Bureau of Standards, Troposphere and Space Telecommunications Division, conducted a series of eight field experiments in 1958 and 1959 to study the variation in the apparent path length of ground-to-ground microwave links (i.e., the variations in phase of 9400 Mc/s signals) and the corresponding variations in radio refractive index and other atmospheric parameters measured at the path terminals. This report summarizes the results obtained on paths in Colorado and Florida. It also includes an analysis of long-term variations in the apparent path length and associated variables recorded during each experiment, and a power spectrum analysis of short-term variations in apparent path length and refractivity. (Author)

C13.46:256 **Field 20I, 14B**
CFSTI Price: MF$0.50
National Bureau of Standards, Washington, D. C.
MICROWAVE REFLECTION TECHNIQUES FOR DENSE PLASMA DIAGNOSTICS.
Technical note,
by S. Takeda and T. Tsukishima. 10 Mar 65, 33p
NBS-TN-256
Hard copy available from Superintendent of Documents, GPO, Washington, D. C. 20402, $0.25.

Descriptors: (*Plasma medium, Probes (Electromagnetic)), (*Probes (Electromagnetic), Plasma medium), Microwaves, Reflection, Measurement, Electron density, Waveguides, Frequency, Boundary layer.

The microwave reflection method for measuring the electron density whose plasma frequency is higher than the probing frequency is described in detail. Various expressions and formulas which are useful for a variety of experimental conditions are given. A method to extend further the measurable density range is proposed. The fringing field effects are considered when a waveguide is used as a probe. References are given to the experimental works which substantiate the theoretical analyses. Also included are the analyses of reflection by a non-uniform boundary and also by an inhomogeneous plasma. (Author)

N66-13330 **Field 20B**
CFSTI Prices: HC$2.00 MF$0.50
Case Inst. of Tech., Cleveland, Ohio.
MORPHOLOGY OF CRYSTALLINE POLYETHYLENE TEREPHTHALATE (PET).
Semiannual progress rept. 1 May-31 Oct 65,
by J. L. Koenig. 1965, 27p
Grant NGR-36-003-054
NASA CR-68610

Descriptors: (*Phthalates, Crystal structure), Polyethylene plastics.

Identifiers: Polyethylene terephthalate.

N66-13349 **Field 20E**
CFSTI Prices: HC$3.00 MF$0.50
Nu Systems, Inc., Palo Alto, Calif.
DEVELOPMENT OF HIGH SPECIFIC POWER HENE LASERS.
Final rept.,
by R. S. Reynolds. 29 Oct 65, 50p
Contract NAS8-11613
NASA CR-68589

Descriptors: (*Lasers, Design), Neon, Helium, Optical tracking.

N66-13351 **Field 20H**
CFSTI Prices: HC$5.00 MF$1.00
Cosmic Ray Group, Univ. of Minnesota, Minneapolis.
CONTRIBUTIONS OF THE UNIVERSITY OF MINNESOTA TO THE NINTH INTERNATIONAL CONFERENCE ON COSMIC RAYS.
Oct 65, 151p CR-82
NASA CR-68663

Descriptors: (*Cosmic rays, Symposia), Scintillation counters.

N66-13397 **Field 20D**
CFSTI Prices: HC$1.00 MF$0.50
National Aeronautics and Space Administration, Cleveland, Ohio. Lewis Research Center.
SATISFACTION OF ASYMPTOTIC BOUNDARY CONDITIONS IN THE NUMERICAL SOLUTION OF BOUNDARY-LAYER EQUATIONS,
by P. R. Nachtsheim and P. Swigert. 1965, 22p
NASA-TM-X-56756
Prepared for presentation at Midwestern Mech. Conf. (9th), Madison, Wis., 16-18 Aug 65.

Descriptors: (*Boundary layer, Mathematical analysis), Differential equations.

N66-13408 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center.
A STUDY OF CYCLIC PLASTIC STRESSES AT A NOTCH ROOT,
by J. H. Crews, Jr. and H. F. Hardrath. 1965, 29p NASA-TM-X-56068
Prepared for presentation at Soc. for Exptl-Stress Analysis Spring Meeting, Denver, 5-7 May 1965, rept. no. Paper-963.

Descriptors: (*Aluminum alloys, Stresses).

N66-13410 **Field 20K**
CFSTI Prices: HC$2.00 MF$0.50
Lehigh Univ., Bethlehem, Pa. Inst. of Research.
DETERMINATION OF THE SURVIVAL PROBABILITY OF A LAUNCH VEHICLE RISING THROUGH A RANDOM WIND FIELD,
by F. P. Beer and W. C. Lennox. 15 Jan 65, 27p
Grant NsG-466
NASA CR-60830

Descriptors: (*Launch vehicles (Aerospace), Wind).

N66-14956 **Field 20N**
CFSTI Prices: HC$3.00 MF$0.50
Ohio State Univ. Research Foundation, Columbus. Antenna Lab.
DETERMINATION OF RMS HEIGHT OF A ROUGH SURFACE USING RADAR WAVES,
by D. E. Barrick. 31 Aug 65, 60p Rept. 1388-19
Grant NsG-213
NASA CR-69207

Descriptors: (*Frequency, Measurement), (*Radio waves, Scattering).

Identifiers: Root mean square error.

N66-14958 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
AVCO-Everett Research Lab., Everett, Mass.
THE ELECTRON PLASMA - EXPERIMENT THEORY AND APPLICATIONS,
by G. S. Janes and R. H. Levy. Jun 65, 25p
AMP-160
Contracts NASw-1101, AF 49 (638)-659
NASA CR-69205

Descriptors: (*Plasma physics, Stability).

Identifiers: Crossed-field devices.

N66-14961 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
RCA Victor Co., Ltd., Montreal (Quebec). Research Labs.
TIME HISTORY OF THE MAGNETOSPHERIC CAVITY,
by M. P. Bachynski, J. V. Gore, and F. J. F. Osborne. Jun 65, 32p RCA Res. rept.-7-801-38
Contract NASw-1088
NASA CR-69201

Descriptors: (*Upper atmosphere, Wind).

N66-15053 **Field 20L**
CFSTI Prices: HC$3.00 MF$0.75
Hawaii Univ., Honolulu.
SOME INTENSITY MEASUREMENTS IN THE VACUUM ULTRAVIOLET,
by R. S. Jackson, F. M. Matsunaga, and K. Watanabe. Jun 64, 65p
Grant NsG-328
NASA CR-58429

Descriptors: (*Metals, Photoemission), (*Semicon ductors, Photoemission).

N66-15067 **Field 20I**
CFSTI Prices: HC$1.00 MF$0.50
Yale Univ., New Haven, Conn. Dept. of Engineering and Applied Science.
EXPERIMENTAL AND THEORETICAL RESEARCH ON PLASMA SHEATHS AND BOUNDARY LAYERS AROUND STAGNATION POINT ELECTRODES.
Semiannual progress rept. no. 2, 1 Jan - 30 Jun 65,
by M. M. Chen. 1965, 19p
Grant NsG-724
NASA CR-69136

Descriptors: (*Boundary layer, Plasma physics), (*Stagnation point, Electrodes).

N66-15069 **Field 20B**
CFSTI Prices: HC$1.00 MF$0.50
United Aircraft Corp., East Hartford, Conn. Research Labs.
INVESTIGATION OF THE KINETICS OF CRYSTALLIZATION OF MOLTEN BINARY AND TERNARY OXIDE SYSTEMS.
Quarterly status rept. no. 1, 1 Sep - 30 Nov 65,
by J. F. Bacon. 30 Dec 65, 17p D-910373-1
Contract NASw-1301
NASA CR-69145

Descriptors: (*Oxides, Crystallization).

N66-15072 **Field 20H**
CFSTI Prices: HC$2.00 MF$0.50
Wisconsin Univ., Madison. Theoretical Chemistry Inst.
THE SUDDEN APPROXIMATION APPLIED TO MOLECULAR PROBLEMS. I. NON-REACTIVE COLLISIONS,
by J. L. J. Rosenfeld. 27 Sep 65, 31p WIS-TCI-128
Grant NsG-275-62
NASA CR-69142
Research sponsored in part by ARPA and Brown, Univ., Providence, R. I.

Descriptors: (*Molecules, Scattering), (*Atoms, Scattering).

ORNL-3852 **Field 20H**
CFSTI Prices: HC$1.00 MF$0.50
Oak Ridge National Lab., Tenn.
CALCULATION OF THE NUCLEON-MESON CASCADE IN IRON INITIATED BY 1- AND 3-GEV PROTONS AND COMPARISON WITH EXPERIMENT,
by R. G. Altmiller, and J. Barish. Dec 65, 15p
Contract W-7405-eng-26

Descriptors: (*Elementary particles, Cascade structure), (*Iron, Nuclear properties).

Patent 3,228,291 **Field 20F, 13I, 14B**
APERTURE FORMING DRIVE MECHANISM.
Patent assigned to Navy,
by George E. Miller. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Spectrum analysers, Drives), (*Drives, Rotation, Control systems, Optical equipment components.

The mechanical drive is used as a drive for producing an accurately located aperture which is used in combination with a fluorescent screen to deter-

mine the position of an ion-ray in tracing the output beam of a charged particle lens system such as at the output of a magnetic spectrometer. The mechanism can be used for many different purposes involving rotary to rotary motion.

Patent 3,228,661 **Field 20D, 14B**
SWIRL GENERATOR.
Patent assigned to Air Force,
by William G. Rose. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Jets, Rotation), Patents, Liquid jets.

The swirl generator produces a swirling jet of fluid such as might be used in chemical mixing or liquid fuel burners. The generator has a solid central body core member and an outer body member separated by an annular passage. The outer body is rotated. Since the central body and outer body rotate as a single unit, the fluid flowing through the narrow annular passage is caused to rotate at the angular velocity of the unit by the viscous sheer stresses in the fluid.

Patent 3,229,157 **Field 20G**
CRICIBLE SURFACE IONIZATION SOURCE.
Patent assigned to AEC,
by Charles M. Stevens and Andrew L. Harkness. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Ion sources, Mass spectroscopy), Patents, Crucibles, Surfaces, Vaporization, High-temperature research.

The ion source is for a mass spectrometer. The ionized particles are produced from a sample which contains trans-plutonium elements. Vaporization is accomplished in a closed container maintained at the proper temperature. The vapor is constrained to a narrow passage in escaping and this passage is maintained at the ionization temperature of 2800 degrees to 3000 degrees K., improving the total overall ionization of the vapor by a substantial factor.

PB-169 433 **Field 20K, 13M, 16D**
CFSTI Price: HC$3.60
Watertown Arsenal Labs., Mass.
DESIGN CRITERION FOR CIRCUMFERENTIAL RING STIFFENERS FOR A CONE LOADED BY EXTERNAL PRESSURE,
by Oscar L. Bowie. 31 Oct 57, 38p WAL-893/199
AD 147 233

Descriptors: (*Conical bodies, Stresses), Rings, Structures, Reinforcing materials, Structural shells, Loading (Mechanics), Experimental design.

Basic ring load solutions are derived which act on a conical shell; these results are applied to a design criterion for circumferential ring stiffeners for a cone loaded by external pressure. The analysis leading to the solution is summarized by discussing (1) the basic equations of a linearized thin-shell theory for axially symmetric deformation, (2) the general solution of the linearized cone theory, (3) the solution for ring load of normal pressure, (4) the solution for ring load of shear, (5) the behavior of the conical shell at the ring load location, (6) asymptotic approximation of the integrals involved in the evaluation of the vertical displacement, and (7) superposition of the preceding cases to obtain a purely radial ring load. The procedure for formulating the desired design criterion is developed by suitable assumptions and application of the preceding results. The pertinent design information includes the reaction force on a ring stiffener, spacing of rings, and stresses in the cone under a ring. (Author)

PB-169 441 **Field 20D**
CFSTI Price: HC$7.60
Princeton Univ., N. J. Dept. of Aeronautical Engineering.
ON THE MIXING THEORY OF CROCCO AND LEES AND ITS APPLICATION TO THE INTERACTION OF SHOCK WAVE AND LAMINAR BOUNDARY LAYER. PART I. GENERALS AND FORMULATION,
by Sin-I Cheng and K. N. C. Bray. May 57, 77p Rept. no. 376
Contract AF 18 (600)-498,
Proj. AF-R-352-20-9
AFOSR TN-57-283,
AD 132 354

Descriptors: (*Laminar boundary layer, Shock waves), (*Turbulent boundary layer, Shock waves), (*Shock waves, Propagation), Fluid mechanics, Mathematical analysis.

The mixing theory of Crocco and Lees is reviewed briefly, and three semiempirical functions are evaluated, in terms of which the theory treats the growth of a boundary layer. A description is given of how the theory may be applied to laminar and turbulent boundary layer shock wave interactions. Three simple approximate solutions of the equations are developed, and finally, an exact solution is found numerically for a laminar boundary layer at a Mach number of 2 and an initial Reynolds number of 100,000. Five shock strengths, giving deflection angles between 2 degrees and 4.2 degrees, are considered. This set of sample calculations illustrates how the theory may be applied to determine the flow configuration of the interaction between shock wave and laminar boundary layer in general. The procedure is then applied to the following specific problem, the determination of the critical strength of the shock wave required to produce incipient separation of a laminar boundary layer on a flat plate for the Reynolds number and Mach number range in which the laminar boundary layer usually occurs. (Author)

PB-169 472 **Field 20M**
CFSTI Price: HC$1.60
New York Naval Shipyard, Brooklyn. Material Lab.
A PROPOSED METHOD FOR MEASURING THERMAL DIFFUSIVITY AT ELEVATED TEMPERATURES.
Final rept.,
by A. Hirschman, W. L. Derksen, and T. I. Monahan. 30 Apr 59, 16p
Proj. NYNS-ML-5046-3, Pt-119
AFSWP 1145,
AD 225 703

Descriptors: (*Thermal diffusion, Solids), (*Heat transfer, High temperature research), (*Solids, Heat transfer), (*Test methods, Thermal diffusion), Thermal radiation, Temperature, Thermal conductivity.

A method was proposed for the measurement of thermal diffusivity of solids as a function of temperature at elevated temperatures. The method consists of generating a temperature oscillation on one face of a finite solid and measuring the phase difference between this oscillation and that which results on the other face. The specimen in the form of a thin disk will be irradiated on one face by chopped radiation in a carbon-arc image furnace. This will result in a steady axial temperature distribution with a small amplitude temperature oscillation superimposed. The phase difference between the fundamental components of the oscillations at both faces will be measured. This phase difference is a function of the diffusivity, frequency of oscillation and thickness of specimen. (Author)

PB-169 473 **Field 20H, 4A**
CFSTI Prices: HC$4.60
Lockheed Missiles and Space Co., Sunnyvale, Calif.
PHYSICS OF THE IONIZATION PROCESSES IN AIR,
by R. E. Meyerott, R. K. M. Landshoff and John Magee. 12 Dec 58, 48p LMSD-48361
Contract AF 29 (601)-512
AD 245 889
Prepared in cooperation with Notre Dame Univ., South Bend, Ind. Dept. of Chemistry.

Descriptors: (*Air, Ionization), (*Ionization, Air), Atmosphere, Electrons, Ions.

In this preliminary report, we are concerned with the response of air to ionizing radiation where the energy absorbed by the air is insufficient to cause an appreciable temperature change. Air which is subjected to weak fluxes of such radiation emits a characteristic fluorescent radiation and is ionized. It is well known that the number of ion pairs produced in air is insensitive to the energy of the radiation, but it is not known experimentally what are the relative numbers of different types of ions, including electrons. A detailed consideration of the mechanisms of energy absorption, and the secondary processes which follow, not only provide considerable quantitative information but also point up areas where further fundamental experimental information is needed.

PB-169 611 **Field 20K, 13M, 9B**
CFSTI Prices: HC$5.60 MF$0.50
Rhode Island Univ., Kingston. Div. of Engineering Research and Development.
A PROGRAM TO ANALYZE CURVED GIRDER BRIDGES,
by Francis H. Lavelle and John S. Boick. Dec 65, 56p Engineering Bull-8
Research sponsored in part by Bureau of Public Roads, Washington, D. C. and Rhode Island Dept. of Public Works.

Descriptors: (*Bridges, Structural properties), (*Beams (Structural), Structural properties), (*Programming (Computers), Bridges), Mechanics, Programming languages, Matrix algebra, Structures, Mathematical analysis.

Identifiers: FORTRAN.

A computer program is given for the analysis of planar grid structures with curved members, loaded normal to their planes. The basic procedure for a general stiffness matrix analysis is outlined, and the equations to develop the required matrices are presented. A detailed flow chart and a complete program listing are given. A simple illustrated example is given, including the detailed development of the matrices used, the required computer input, and the computer output. The program is written in IBM 1410 FORTRAN IV in such a way that it can be modified rather easily for any computer which uses a FORTRAN IV programming language. (Author)

UCRL-14360 **Field 20H, 20D, 20M**
CFSTI Prices: HC$4.00 MF$0.75
Lawrence Radiation Lab., Univ. of California, Livermore.
PHYSICS DEPARTMENT PROGRESS REPORT, FEBRUARY-MAY 1965,
by A. Lorenz. 1965, 108p
Contract W-7405-eng-48

Descriptors: (*Physics, Scientific research).

UCRL-14399 **Field 20K, 20M**
CFSTI Prices: HC$2.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.
A COVARIANT FORM OF CONTINUUM MECHANICS AND THERMODYNAMICS,
by M. Neuman. 25 Aug 65, 36p
Contract W-7405-eng-48

Descriptors: (*Continuum mechanics, Invariance), (*Thermodynamics, Invariance).

UCRL-14438 **Field 20I, 20N**
CFSTI Prices: HC$1.00 MF$0.50
Lawrence Radiation Lab., Univ. of California, Livermore.

EFFECT OF A RADIALLY INHOMOGENEOUS PLASMA ON MICROWAVE INTERFEROMETER MEASUREMENTS,
by Herman Schneider. 27 Sep 65, 18p
Contract W-7405-eng-48

Descriptors: (*Plasma physics, Interferometers), (*Interferometers, Microwaves).

21. PROPULSION AND FUELS

AD-275 325 **Field 21B, 21I, 20D, 7D**
CFSTI Prices: HC$3.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
TASK R.
Quarterly progress rept. no. 12, 1 Jan-31 Mar 62, by A. A. Westenberg. 31 Mar 62, 36p TG-331-12
Contract NOrd-7386, ARPA Order-22-59, Task 5

Descriptors: (*Propulsion, Scientific research), (*Fluid dynamic properties, Rocket propulsion), (*Rocket motor nozzles, Fluid dynamic properties), (*Gas flow, Rocket propulsion), Test methods, High temperature research, Combustion chamber gases, Heat transfer, Solid rocket propellants, Kinetic theory, Thermal conductivity, Probes (Electromagnetic), Combustion, Exhaust flames, Exhaust gases.

Identifiers: Task R.

High temperature kinetics in laminar flames; Work continued on checking the reliability of the scavenger probe sampling technique for measuring O-atom concentration. Comparisons were made between this method and the NO2 titration method. Thermal conductivity of gases; Improvements in the mixing and vaporizing accessories to the line source apparatus have helped to alleviate the flow fluctuations previously noted in the H2O-O2 study. Data are given for results on pure O2 and on a mixture of 25 mole % H2O - 75 mole % O2 over the temperature range 400 - 1100 K. Rocket nozzle fluid dynamics: Boundary layer measurements at the 2-in. station downstream of the throat were initiated. Results on four tests of throat heat transfer rates are given and compared with theory. Infrared absorption results on CO2 and CO in the 12.5 degree nozzle are presented. Rocket nozzle chemical kinetics; A new series of calculations of non-equilibrium flow through a supersonic expansion section has been undertaken for H2-air combustion products. (Author)

AD-295 750 **Field 21B, 21I, 20D, 7D**
CFSTI Prices: HC$3.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
TASK R.
Quarterly progress rept. no. 15, 1 Oct-31 Dec 62, by A. A. Westenberg. 31 Dec 62, 38p TG-331-15
Contract NOw-62-0604-c, ARPA Order-22-62

Descriptors: (*Propulsion, Scientific research), (*Fluid dynamic properties, Propulsion), (*Rocket motor nozzles, Fluid dynamic properties), (*Gas flow, Propulsion), High temperature research, Rocket propulsion, Gaseous rocket propellants, Gases, Heat transfer, Thermal conductivity, Dissociation, Exhaust gases, Molecular beams, Test methods, Kinetic theory, Diffusion.

Identifiers: Task R.

Research performed under Task R is concerned with the long-range development of improved propulsion systems. The general emphasis is on the physico-chemical and fluid dynamic behavior of high temperature, high speed gas flows such as occur in most advanced propulsion systems.

AD-462 337 **Field 21B, 21H**
CFSTI Price: HC$6.60
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
THEORETICAL CONSIDERATIONS RELATING TO THE EFFECT OF INJECTOR DESIGN ON UNSTABLE BURNING OF LIQUID PROPELLANT ROCKET MOTORS.
Technical memo.,
by F. T. McClure, R. H. Cantrell and R. W. Hart.
Feb 65, 62p TG-661
Contract NOw-62-0604-c

Descriptors: (*Liquid rocket propellants, Combustion), (*Combustion, Stability), (*Rocket motors (Liquid Propellant), Combustion), Fuel injectors, Design, Gas flow, Perturbation theory, Pressure, Velocity, Numerical analysis.

Rocket motors burn unstably when the rate of conversion of liquid propellants to product gases is influenced by disturbances in the internal gas dynamic field in such a way as to amplify the disturbances more than they are attenuated by the various damping mechanisms. Thus, it has long been ecognized that coupling between the conversion process and the internal field is of vital importance to motor stability. Of the several mechanisms which are found to influence this coupling significantly, the influence of the injector configuration has been least studied theoretically. The present study is concerned with the influence of one specific family of injectors, namely the so-called like-on-unlike impinging doublet. In such an injector, the conversion process may be considered to begin at the point of impingement of the liquid streams. It is clear that fluctuations in the gas dynamic field may cause the point of impingement to fluctuate, and thereby produce fluctuations in the rate of feed of liquid into the conversion region. That these fluctuations may have a very significant effect on motor stability is suggested by numerical calculations based on a crude analytical model. A number of the features of 'injector zone coupling' are then discussed physically, and shown to be a large extent independent of the crudity of the analytical model. (Author)

AD-476 299 **Field 21H, 21I, 21B**
CFSTI Prices: HC$3.00 MF$0.75
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
SOLID PROPELLANT INSTABILITY OF COMBUSTION 1964. APPENDIX I: THEORY OF ACOUSTIC INSTABILITY IN SOLID ROCKET COMBUSTION. APPENDIX II: EXPERIMENTAL SOLID ROCKET COMBUSTION INSTABILITY.
Status rept.,
by R. W. Hart, F. T. McClure, E. W. Price, and W. G. Berl. July 64, 64p TG-371-8A
Contract NOw-62-0604-c

Descriptors: (*Rocket motors (Solid propellant), Stability), (*Solid rocket propellants, Combustion), (*Combustion, Stability), Reviews, Pressure, Erosive burning, Acoustics, Oscillation, Fuel additives, Aluminum, Aluminum compounds, Oxides, Vibration, Scale.

Identifiers: Aluminized propellants.

A review is given of the phenomenon of combustion instability in solid propellant motors, with emphasis of advances occurring since the publication of a similar review in 1960 (AD-244 320). Topics include: pressure response; erosive response; nonlinear instability; acoustic loss mechanisms; change in the mean pressure and other consequences of high amplitude oscillation; vibrations in the solid; non-acoustic instability; aluminum and aluminum oxide as additives; the scaling problem. Two papers prepared for presentation at the Tenth Symposium (International) on Combustion are included as appendices.

Patent 3,228,334 **Field 21H, 11A**
BONDLESS 'HIGH PERFORMANCE' ROCKET NOZZLE CLOSURE.
Patent assigned to Navy,
by George K. Oss. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Rocket motor nozzles, Seals (Stoppers)), Patents, Expanded plastics, Styrene plastics, Cellulose acetate, Diaphrams (Mechanics).

The closure is for the exhaust nozzles of missiles of the Polaris type. The closure ejects when subjected to 130 p.s.i.a. The structure includes a Styrofoam plug, a cellulose acetate facing plate adhering to the plug and a diaphragm which extends across the facing of the plug and around the rim of the nozzle.

Patent 3,228,338 **Field 21B, 21I**
METHOD FOR INCREASING THE BURNING RATE OF PROPELLANTS.
Patent assigned to Navy,
by William S. McEwan, Alvin S. Gordon and Joseph Cohen. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Propellants, Burning rate), Patents, Nitrocellulose, Nitroglycerin, Addives, Polymers.

The double-base propellant compositions are used for the propulsion of a jet actuated device. The compositions contain as major ingredients a high explosive such as nitroglycerine and a high energy polymer such as nitroglycerine and a high energy polymer such as nitrocellulose. The improved compositions contain from 2 to 15 percent of short segments of wire of metals such as silver, aluminum, copper, lead, molybdenum or tantalum.

Patent 3,228,815 **Field 21I, 21B**
BASE PROPELLANTS OF INCREASED BURNING RATE CONTAINING BENZOPHENONES.
Patent assigned to Navy,
by Ronald A. Henry and William S. McEwan. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Rocket propellants, Burning rate), Patents, Nitrocellulose, Nitroglycerin, Benzophenones.

The propellants are used as rocket propulsion fuels. They contain from 44 to 60 percent nitrocellulose, 28 to 47 percent nitroglycerin, from 2 to 5 percent of a ballistic modifier such as lead salicylate and a benzophenone such as 2,4-dihydroxybenzophenone.

Patent 3,229,139 **Field 21B**
HIGH TEMPERATURE SPARK PLUG.
Patent assigned to NASA,
by John E. Watson. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Spark plugs, Ignitors), Liquid rocket fuels, High-temperature research.

The ignitor plug is capable of operating in the extremely hot environment of liquid fueled rockets. The ignitor plug has an electrically conductive annular electrode of a temperature resistant material, and this electrode encloses the base of the plug casing to shield the center electrode. The annular electrode forms a chamber adjacent the innermost end of the center electrode, and an aperture in the annular electrode that is aligned with the center electrode provides gaseous communication between the plug exterior and the center electrode.

22. SPACE TECHNOLOGY

AD-466 637 **Field 22C, 8N**
CFSTI Prices: HC$4.60 MF$0.50
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
THE PASSIVE MAGNETIC ORIENTATION OF SATELLITE INJUN 3.
Progress rept.,
by Theodore A. Fritz. Jun 65, 44p Rept. no. 65-21
Contract Nonr-1509 (06)

Descriptors: (*Scientific satellites, Satellite trajectories), (*Satellite trajectories, Magnetic fields), (*Terrestrial magnetism, Satellite trajectories), Alignment, Vector analysis, Magnetometers, Calibration.

Identifiers: Injun III, Geophysical satellites.

An investigation of the effectiveness of the passive magnetic orientation system of Injun 3 in attaining and maintaining alignment with geomagnetic vector B is presented. The deviation from alignment was studied as a function of latitude (L), Strength of the geomagnetic field present, and rate of change of the direction of the geomagnetic vector B. It was found that the passive magnetic orientation system of Injun 3 was able to dissipate the initial angular kinetic energy of the satellite such that the maximum angular deviation from alignment was damped from a deviation in excess of 115 degrees to less than 10 degrees in approximately two weeks. It was also found that this orientation system was able to maintain alignment over the active lifetime of the satellite to the extent that the RMS deviation was less than 5 degrees under almost all conditions. (Author)

AD-467 993 **Field 22C, 22A, 3B**
CFSTI Prices: HC$2.60 MF$0.50
Johns Hopkins Univ., Silver Spring, Md. Applied Physics Lab.
AN OBSERVATION OF THE SATELLITE PERTURBATION PRODUCED BY THE SOLAR TIDE.
Technical memo.,
by Robert R. Newton. Jun 65, 24p TG-709
Contract NOw-62-0604-c

Descriptors: (*Satellites (Artificial), Polar orbit trajectories), (*Celestial mechanics, Satellites (Artificial)), (*Astronautics, Celestial mechanics), Sun, Moon, Atmospheric tides, Perturbation theory, Mathematical analysis.

By analysis of perturbations in the inclinations of two nearly polar satellites, a reasonable value is found for the tidal number k that is effective for the total of earth and ocean tides, for the semidiurnal solar tide. Similar methods can be applied to the lunar tide. The amount of tidal friction is not found accurately. It is believed that the error in the friction is produced by a perturbation on the satellites that has not been identified. (Author)

N63-90006 **Field 22A, 1B**
CFSTI Prices: HC$7.35 MF$2.00
National Aeronautics and Space Administration, Washington, D. C.
INDEX OF NASA TECHNICAL PUBLICATIONS WITH ABSTRACTS, JULY 1960-DECEMBER 1961.
Dec 61, 433p NASA-SP-9

Descriptors: (*Aeronautics, Bibliographies), (*Spacecraft, Subject indexing), (*Space flight, Indexes).

Identifiers: National Aeronautics and Space Administration.

N66-13374 **Field 22D**
CFSTI Prices: HC$2.00 MF$0.50
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
CHARACTERISTICS AND FORMAT OF THE TRACKING DATA TO BE OBTAINED BY THE NASA DEEP SPACE INSTRUMENTATION FACILITY FOR LUNAR ORBITER,
by J. D. Anderson, J. Lorell, and W. L. Sjogren. 15 Jun 65, 38p JPL-TM-33-230
Contract NAS7-100
NASA CR-68619

Descriptors: (*Lunar satellites, Tracking).

N66-13399 **Field 22A**
CFSTI Prices: HC$5.00 MF$1.00
Aeronutronic, Div. Philco Corp., Newport Beach, Calif.
FACSIMILE AND ACCELEROMETER SYSTEMS INTEGRATION STUDY.
Interim rept.
15 May 62, 150p U-1658
Contract NAS7-100
NASA CR-50432
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena, Rept. no. JPL-950267.

Descriptors: (*Moon, Terrain), (*Photography, Moon).

N66-13403 **Field 22B**
CFSTI Prices: HC$8.66 MF$2.75
General Electric Co., Philadelphia, Pa. Missile and Space Div.
VOYAGER DESIGN STUDY. VOLUME IV. SYSTEM DESIGN.
15 Oct 63, 566p DOC-63SD801
Contract NASw-696
NASA CR-51839

Descriptors: (*Venus, Landings), (*Mars, Landings).

Identifiers: Voyager project.

N66-13451 **Field 22A**
CFSTI Prices: HC$4.00 MF$1.00
Bendix Systems Div., Bendix Corp., Ann Arbor, Mich.
SURVEYOR LUNAR ROVING VEHICLE, PHASE I. VOLUME V. SYSTEM EVALUATION.
Final technical rept.
Apr 64, 124p BSR-903, Vol. V
Contract JPL-950656
NASA CR-68648
Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Systems Div.

Descriptors: (*Lunar satellites, Design).

Identifiers: Surveyor project, Apollo project.

N66-13475 **Field 22A**
CFSTI Prices: HC$5.00 MF$1.00
Bendix Systems Div., Bendix Corp., Ann Arbor, Mich.
SURVEYOR LUNAR ROVING VEHICLE, PHASE I. VOLUME III. PRELIMINARY DESIGN AND SYSTEM DESCRIPTION. BOOK I. SYSTEM DESCRIPTION AND PERFORMANCE CHARACTERISTICS.
Final technical rept.
Apr 64, 144p BSR-903, Vol. III, Bk. I
Contract JPL-950656
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Prepared in cooperation with Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena. Systems Div.

Descriptors: (*Lunar satellites, Design).

Identifiers: Surveyor project.

N66-14968 **Field 22A**
CFSTI Prices: HC$4.00 MF$1.00
Douglas Aircraft Co., Inc., Santa Monica, Calif. Missile and Space Systems Div.
STUDY OF THE FEASIBILITY OF AN EARLY LUNAR FLARE.
Final rept.
Jul 64, 139p SM-47954
Contract NAS7-281
NASA CR-69194

Descriptors: (*Moon, Surfaces).

N66-15066 **Field 22D**
CFSTI Prices: HC$6.00 MF$1.50
Michigan Univ., Ann Arbor.
LAUNCH VEHICLE OPTIMIZATION, PHASE II. VOLUME III. TECHNIQUES DEVELOPMENT.
Final rept.
Sep 65, 294p GRR-65-1089-III
Contract NASw-938
NASA CR-69214

Descriptors: (*Launch vehicles (Aerospace), Optimization), Programming (Computers), Digital computers, Simulation.

Patent Design 203, 902 **Field 22B**
RE-ENTRY VEHICLE OR SIMILAR ARTICLE.
Patent assigned to Air Force,
by Frederick Raymes. 22 Feb 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Reentry vehicles, Design), Patents, Aerodynamic configurations.

The maneuverable space vehicle is designed for use as a re-entry vehicle for astronauts. The vehicle has a generally rounded, pointed nose structure which flares outwardly and rearwardly to form the main body of the vehicle. The rear configuration is rectangular in cross section. Control components are fixed to the rear portion of the vehicle.

Patent 3,228,628 **Field 22B**
METHOD AND APPARATUS FOR MAGNETICALLY ORIENTING A SPACE VEHICLE.
Patent assigned to Navy,
by Talbot A. Chubb. 11 Jan 66
Available from Commissioner of Patents, Washington, D.C., 20231, $0.50

Descriptors: (*Spacecraft, Control systems), Magnetic moments, Spin, Spinning, Torque, Stabilization, Computer logic.

The system includes a computer logic circuit for controlling a magnetic moment device in response to sensed conditions for applying correction torques to a spinning space vehicle. The system involves sensing the relationship of the earth's magnetic field to a vector perpendicular to the spin axis of the satellite sensing the relationship of the equatorial plane of the satellite with a vector direction defined by a line from the satellite to the sun and applying a corrective torque to the spin axis in the direction indicated to be necessary by the sensed relationships to precess the spin axis to a position whereby it is perpendicular to an imaginary line connecting the satellite and the sun.

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